TEST REPORT

of

FCC Part 15 Subpart C §15.209
IC RSS-210 Issue 10, RSS-Gen Issue 5

FCC ID: TQ8-IBU-4E09
IC Certification: 5074A-IBU4E09

Equipment Under Test	:	SMART KEY ECU
Model Name	:	IBU-4E09
Applicant	:	Hyundai Mobis Co., Ltd.
Manufacturer	:	Hyundai Mobis Co., Ltd.
Date of Receipt	:	2019.12.24
Date of Test(s)	:	2020.01.11 ~ 2020.01.19
Date of Issue	:	2020.01.23

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

Tested By: **Murphy Kim** **Date:** **2020.01.23**

Technical Manager: **Jungmin Yang** **Date:** **2020.01.23**

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1. General Information

1.1. Testing Laboratory

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

All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.
Phone No. : +82 31 688 0901
Fax No. : +82 31 688 0921

1.2. Details of Applicant

Applicant : Hyundai Mobis Co., Ltd.
Address : 203, Teheran-ro, Gangnam-gu, Seoul, South Korea, 135-977
Contact Person : Choe, Seung-Hoon
Phone No. : +82 31 260 0098

1.3. Details of Manufacturer

Applicant : Same as applicant
Address : Same as applicant

1.4. Description of EUT

Kind of Product		SMART KEY ECU
Model Name		IBU-4E09
Power Supply		DC 12.0 V
Frequency Range		Tx: 125.00 ㎑, Rx: 433.92 ㎒
Antenna Type	**Tx**	Coil Antenna
	Rx	PCB pattern antenna

1.5. Declaration of Manufacturer

- The EUT has 7 transmit antennas and one receive antenna.
- The transmit antennas can not operate at the same time.

1.6. Test Equipment List

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Interval	Cal. Due
Spectrum Analyzer	R&S	FSV30	100768	Mar. 08, 2019	Annual	Mar. 08, 2020
Signal Generator	R&S	SMBV100A	259067	Jun. 10, 2019	Annual	Jun. 10, 2020
DC Power Supply	Agilent	U8002A	MY50060028	Mar. 12, 2019	Annual	Mar. 12, 2020
Test Receiver	R&S	ESU26	100109	Jan. 31, 2019	Annual	Jan. 31, 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
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	Jul. 20, 2019	Semi-annual	Jan. 20, 2020
Coaxial Cable	SUCOFLEX	104 (10 m)	MY3145814	Jul. 20, 2019	Semi-annual	Jan. 20, 2020

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. Summary of Test Results

The EUT has been tested according to the following specifications:

Applied standard: FCC Part15 subpart C, IC RSS-210 Issue 10, RSS-Gen Issue 5			
Section in FCC	**Section in IC**	**Test Item**	**Result**
15.209	RSS-210 Issue 10, 7.3, RSS-Gen Issue 5, 8.9	Radiated emission, Spurious Emission and Field Strength of Fundamental	Complied
2.1049	-	20 ㏈ Bandwidth	Complied
-	RSS-Gen Issue 5 6.7	Occupied Bandwidth	Complied

1.9. 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 Emission, 9 ㎑ to 30 ㎒	± 3.59 ㏈
Radiated Emission, below 1 ㎓	± 5.88 ㏈

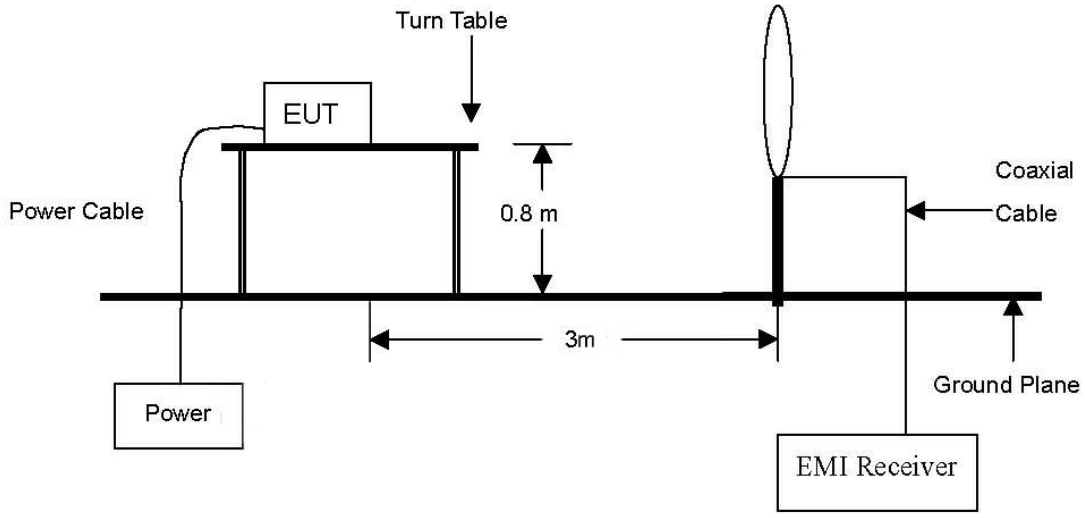
1.10. Test Report Revision

Revision	Report Number	Date of Issue	Description
0	F690501-RF-RTL000210	2020.01.1.23	Initial

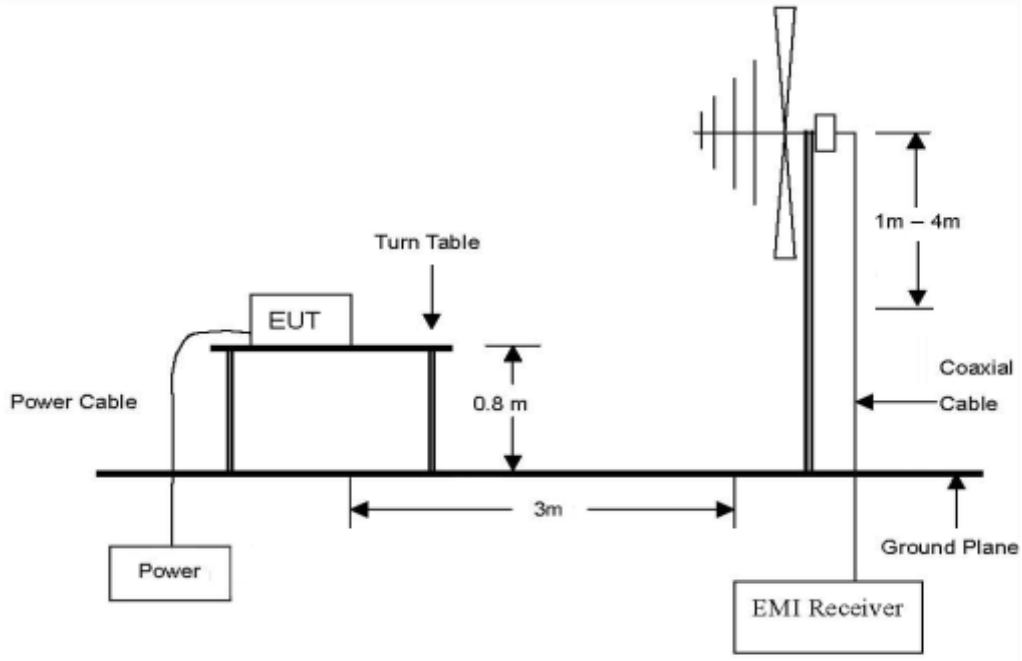
2. Field Strength of Fundamental and Spurious Emission

2.1. Test Setup

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



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



2.2. Limits

2.2.1. FCC

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.

According to §15.209(d), The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 ㎑, 110-490 ㎑ and above 1 000 ㎒. Radiated emission limits in these three bands are based on measurements employing an average detector.

2.2.2. IC

2.2.2.1. Transmitter emission limits

According to RSS-Gen Issue 5, 8.9.
Except where otherwise indicated in the applicable RSS, radiated emissions shall comply with the field strength limits shown in table 5 and table 6. Additionally, the level of any transmitter unwanted emission shall not exceed the level of the transmitter's fundamental emission.

Table 5 - General field strength limits at frequencies above 30 ㎒

Frequency (㎒)	Field Strength (㎶/m at 3 m)
30-88	100
88-216	150
216-960	200
Above 960	500

Table 6 - General field strength limits at frequencies below 30 ㎒

Frequency	Magnetic Field Strength (H-Field) (㎂/m)	Measurement Distance (m)
9-490 ㎑ [1]	6.37/F (F in ㎑)	300
490-1 705 ㎑	63.7/F (F in ㎑)	30
1.705-30 ㎒	0.08	30

Note 1: The emission limits for the ranges 9-90 ㎑ and 110-490 ㎑ are based on measurements employing a linear average detector.

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 ㎒

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
2. 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.
3. 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.
4. The test-receiver system was set to average or quasi peak detect function and Specified Bandwidth with Maximum Hold Mode.
5. To get a maximum emission level from the EUT, the EUT is manipulated through three orthogonal planes (X, Y, Z). Worst orthogonal plan of EUT is **X – axis** during radiation test.

2.4. Field Strength of Fundamental Test Result

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

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

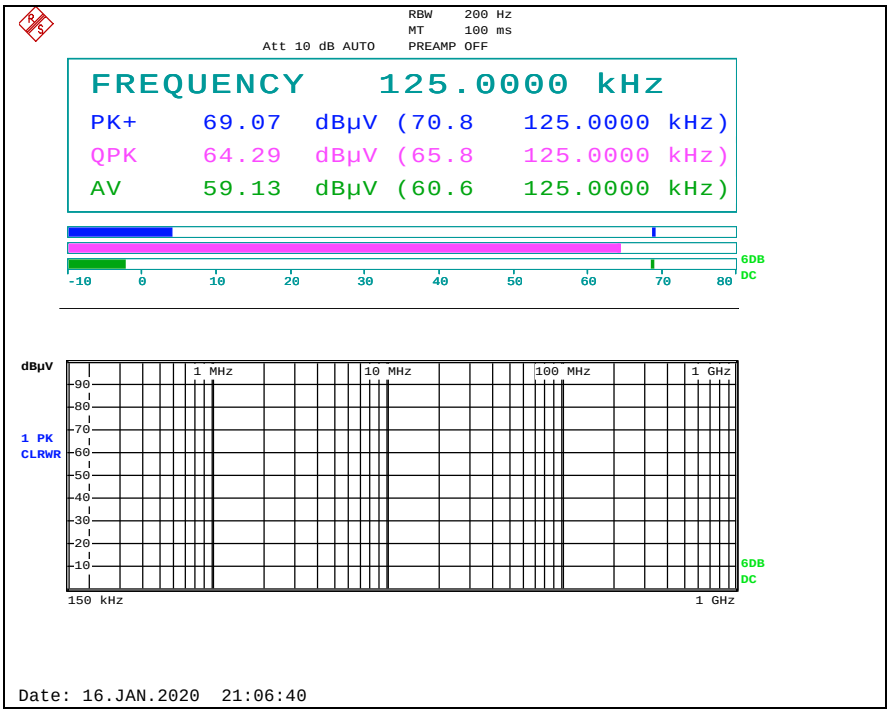
Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB㎶/m) at 3 m	Actual (dB㎶/m) at 300 m	Limit (dB㎶/m) at 300 m	Margin (dB)
DRV Antenna									
0.125	60.60	Average	H	17.80	0.07	78.47	-1.53	25.67	27.20
AST Antenna									
0.125	65.40	Average	H	17.80	0.07	83.27	3.27	25.67	22.40
INT1 Antenna									
0.125	59.70	Average	H	17.80	0.07	77.57	-2.43	25.67	28.10
INT2 Antenna									
0.125	63.40	Average	H	17.80	0.07	81.27	1.27	25.67	24.40
TRK Antenna									
0.125	61.40	Average	H	17.80	0.07	79.27	-0.73	25.67	26.40
BMP Antenna									
0.125	63.30	Average	H	17.80	0.07	81.17	1.17	25.67	24.50
SSB Antenna									
0.125	66.60	Average	H	17.80	0.07	**84.47**	4.47	25.67	21.20

Remark;

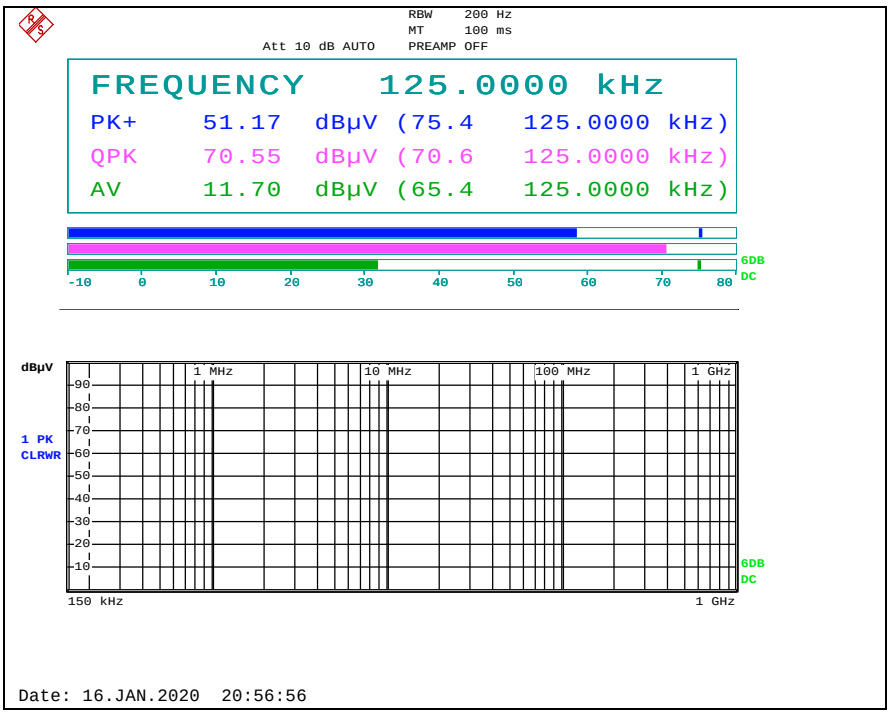
1. According to §15.31(f)(2) 300 m Result (dB㎶/m) = 3 m Result (dB㎶/m) - 40log (300/3) (dB㎶/m).
2. According to §15.209(d), the measurements were tested by using Quasi peak detector except for the frequency bands 9-90 ㎑, 110-490 ㎑ and above 1 000 ㎒ in these three bands on measurements employing an average detector.
3. The limit above was calculated based on table of §15.209(a).
4. According to ANSI C63.10: 2013, For measurement below 30 ㎒.
   conversion factor from E-field to H-field is considered as free-space impedance [1 ㎶/m = (1/377 Ω) × 1 ㎂/m]
   The FCC limits are same to the IC limits.
5. Actual (dB㎶/m) at 3 m = Reading (dB㎶) + AF (dB/m) + CL (dB).

- Test plots

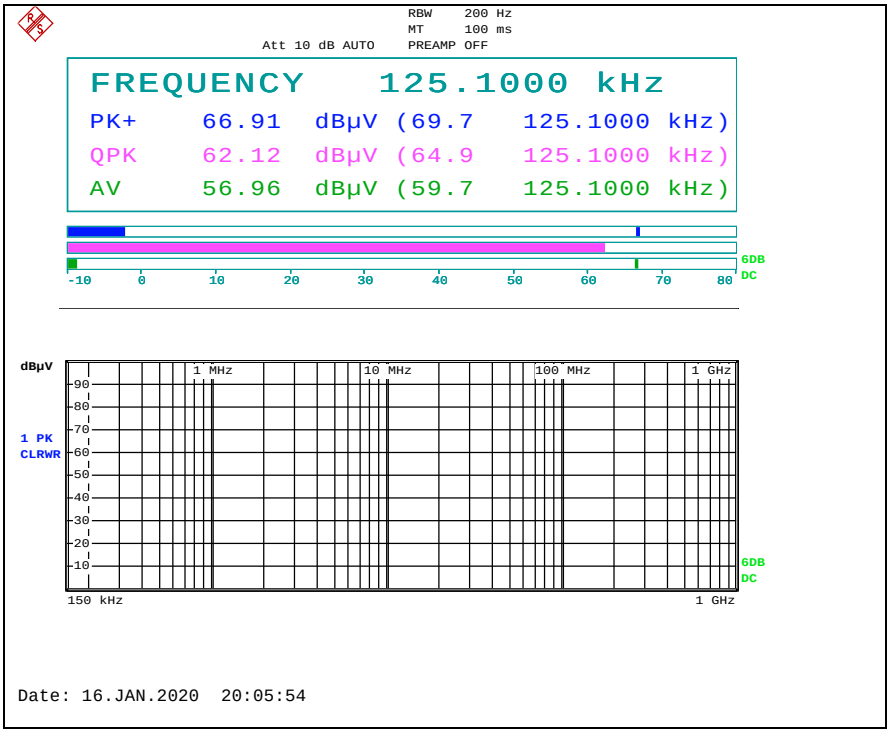
- DRV Antenna



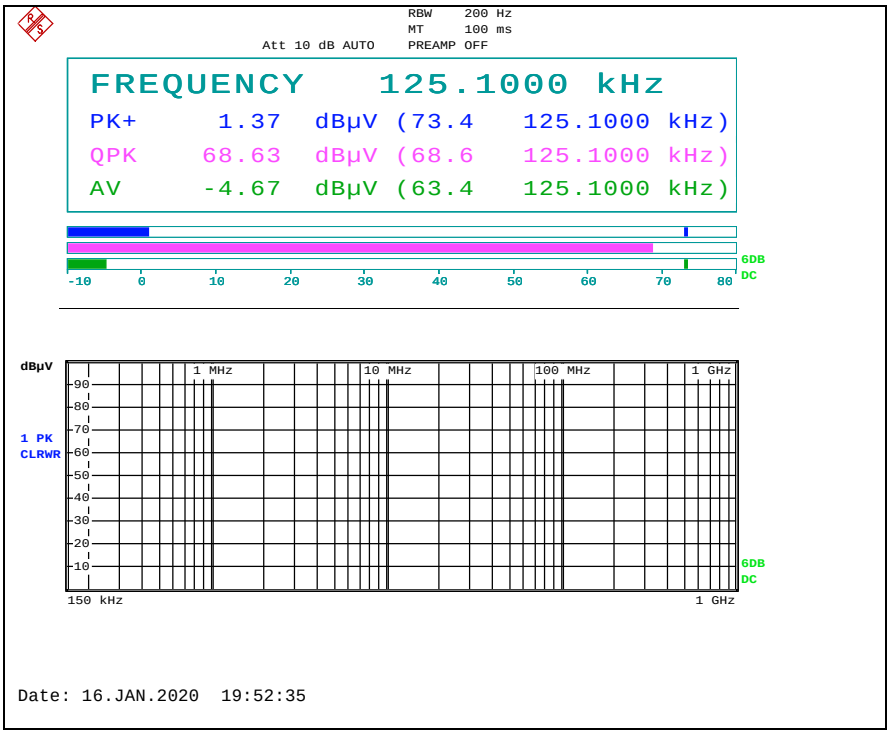
- AST Antenna



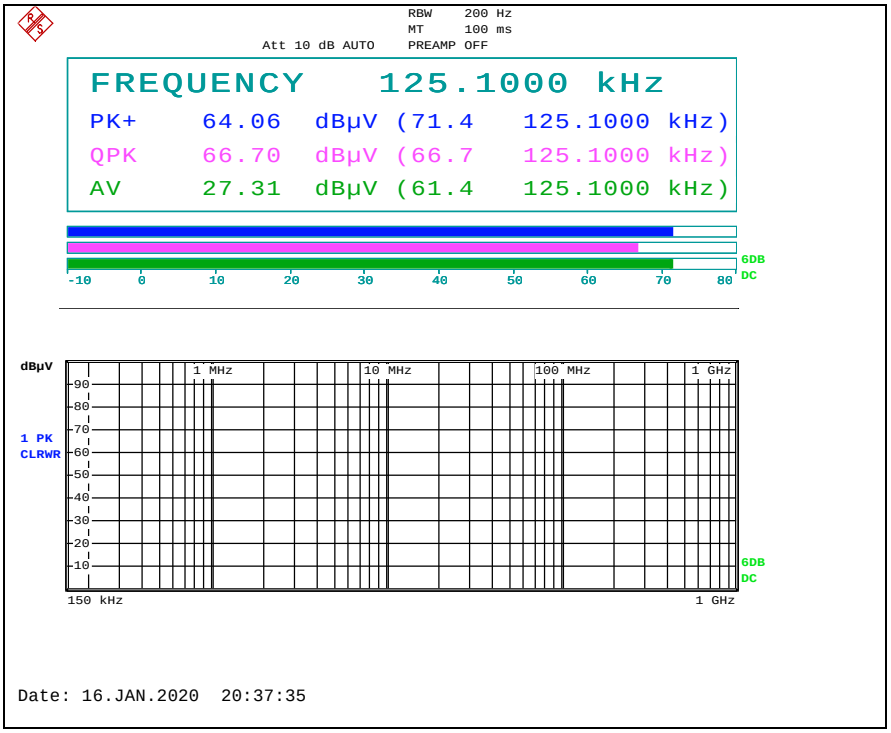
- INT1 Antenna



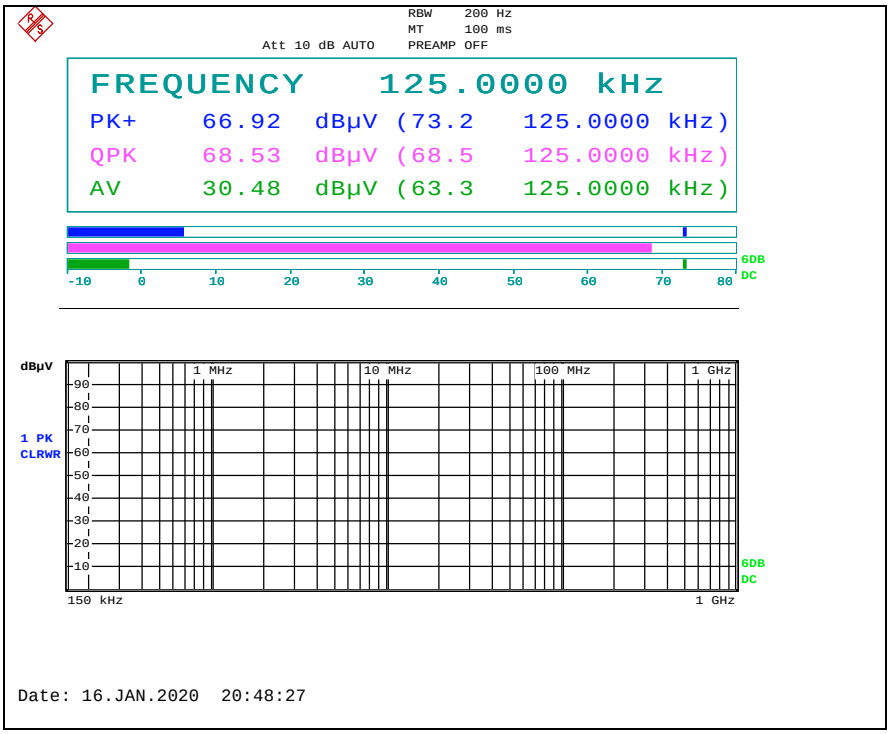
- INT2 Antenna



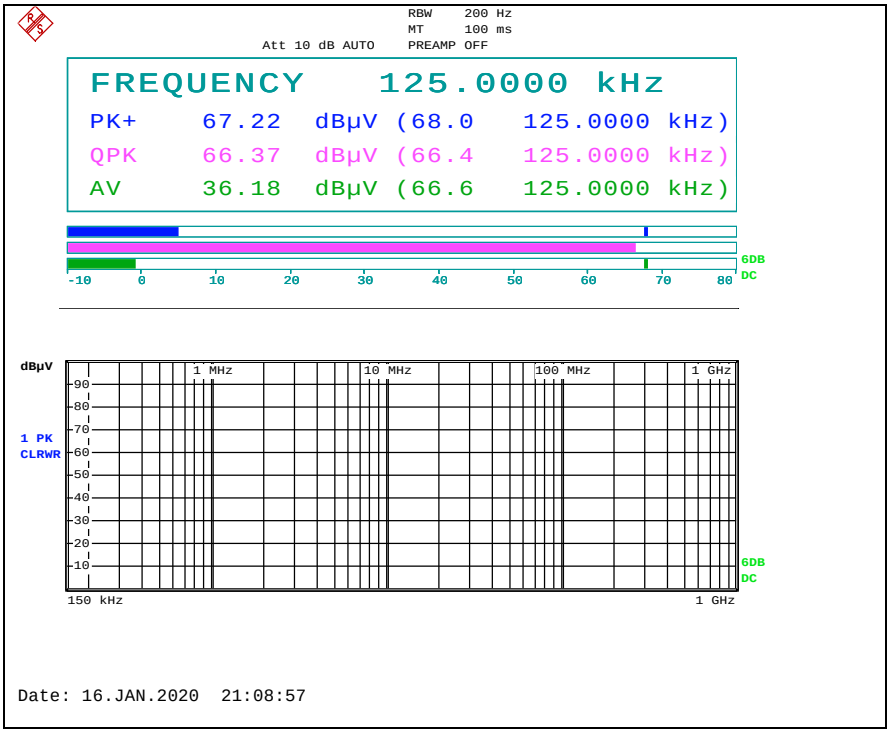
- TRK Antenna



- BMP Antenna



- SSB Antenna


RBW 200 Hz
MT 100 ms
Att 10 dB AUTO PREAMP OFF
FREQUENCY 125.0000 kHz
PK+ 67.22 dBµV (68.0 125.0000 kHz)
QPK 66.37 dBµV (66.4 125.0000 kHz)
AV 36.18 dBµV (66.6 125.0000 kHz)
6DB
DC
-10 0 10 20 30 40 50 60 70 80
dBµV
1 MHz
10 MHz
100 MHz
1 GHz
1 PK
CLRWR
90 80 70 60 50 40 30 20 10
6DB
DC
150 kHz
1 GHz
Date: 16.JAN.2020 21:08:57

2.5. Spurious Emission Test Result

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

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

DRV Antenna

Below 30 ㎒

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dB㎶/m) at 3 m	Actual (dB㎶/m) at 300 m or 30 m	Limit (dB㎶/m) at 300 m or 30 m	Margin (dB)
0.018	23.50	Average	H	18.26	0.01	41.77	-38.23	42.50	80.73
0.047	9.90	Average	H	17.88	0.02	27.80	-52.20	34.16	86.36
0.074	3.50	Average	H	17.84	0.03	21.37	-58.63	30.22	88.85
0.193	6.10	Average	H	17.80	0.14	24.04	-55.96	21.89	77.85
0.353	1.50	Average	H	17.77	0.23	19.50	-60.50	16.65	77.15

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)
125.79	35.40	Peak	H	14.80	-25.53	24.67	43.50	18.83
151.01	38.70	Peak	H	13.90	-25.60	27.00	43.50	16.50
191.99	34.20	Peak	H	16.50	-25.32	25.38	43.50	18.12
401.51	33.30	Peak	V	21.63	-25.12	29.81	46.00	16.19
463.83	35.40	Peak	V	22.15	-25.02	32.53	46.00	13.47
Above 500.00	Not detected	-	-	-	-	-	-	-

AST Antenna

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	29.20	Average	H	18.23	0.01	47.44	-32.56	42.03	74.59
0.031	19.00	Average	H	17.90	0.02	36.92	-43.08	37.78	80.86
0.067	19.70	Average	H	17.85	0.03	37.58	-42.42	31.08	73.50
0.082	11.40	Average	H	17.83	0.03	29.26	-50.74	29.33	80.07
0.220	13.20	Average	H	17.80	0.16	31.16	-48.84	20.76	69.60

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)
125.79	34.60	Peak	H	14.80	-25.53	23.87	43.50	19.63
151.01	38.40	Peak	H	13.90	-25.60	26.70	43.50	16.80
208.00	34.10	Peak	H	16.66	-25.54	25.22	43.50	18.28
327.31	33.20	Peak	H	19.84	-25.25	27.79	46.00	18.21
401.03	33.20	Peak	V	21.62	-25.12	29.70	46.00	16.30
470.14	35.60	Peak	V	22.31	-24.94	32.97	46.00	13.03
Above 500.00	Not detected	-	-	-	-	-	-	-

INT1 Antenna

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	24.20	Average	H	18.23	0.01	42.44	-37.56	42.03	79.59
0.046	13.10	Average	H	17.88	0.02	31.00	-49.00	34.35	83.35
0.067	18.40	Average	H	17.85	0.03	36.28	-43.72	31.08	74.80
0.074	12.10	Average	H	17.84	0.03	29.97	-50.03	30.22	80.25
0.204	14.70	Average	H	17.80	0.15	32.65	-47.35	21.41	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)
125.79	35.00	Peak	H	14.80	-25.53	24.27	43.50	19.23
151.01	38.30	Peak	H	13.90	-25.60	26.60	43.50	16.90
352.53	32.00	Peak	V	20.95	-25.32	27.63	46.00	18.37
401.51	33.00	Peak	H	21.63	-25.12	29.51	46.00	16.49
459.71	35.10	Peak	V	21.99	-25.07	32.02	46.00	13.98
Above 500.00	Not detected	-	-	-	-	-	-	-

INT2 Antenna

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	25.30	Average	H	18.23	0.01	43.54	-36.46	42.03	78.49
0.047	16.30	Average	H	17.88	0.02	34.20	-45.80	34.16	79.96
0.067	20.10	Average	H	17.85	0.03	37.98	-42.02	31.08	73.10
0.074	10.50	Average	H	17.84	0.03	28.37	-51.63	30.22	81.85
0.188	15.50	Average	H	17.80	0.14	33.44	-46.56	22.12	68.68
0.360	8.40	Average	H	17.77	0.24	26.41	-53.59	16.48	70.07

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)
125.79	34.60	Peak	H	14.80	-25.53	23.87	43.50	19.63
151.01	38.50	Peak	H	13.90	-25.60	26.80	43.50	16.70
208.00	33.50	Peak	H	16.66	-25.54	24.62	43.50	18.88
327.31	34.00	Peak	H	19.84	-25.25	28.59	46.00	17.41
463.35	35.10	Peak	V	22.13	-25.03	32.20	46.00	13.80
Above 500.00	Not detected	-	-	-	-	-	-	-

TRK Antenna

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	24.20	Average	H	18.23	0.01	42.44	-37.56	42.03	79.59
0.047	15.40	Average	H	17.88	0.02	33.30	-46.70	34.16	80.86
0.067	19.70	Average	H	17.85	0.03	37.58	-42.42	31.08	73.50
0.074	10.90	Average	H	17.84	0.03	28.77	-51.23	30.22	81.45
0.210	11.50	Average	H	17.80	0.16	29.46	-50.54	21.16	71.70

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)
125.79	36.10	Peak	H	14.80	-25.53	25.37	43.50	18.13
151.01	39.40	Peak	H	13.90	-25.60	27.70	43.50	15.80
327.06	32.80	Peak	H	19.82	-25.25	27.37	46.00	18.63
464.08	34.50	Peak	V	22.16	-25.02	31.64	46.00	14.36
Above 500.00	Not detected	-	-	-	-	-	-	-

BMP Antenna

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	28.60	Average	H	18.23	0.01	46.84	-33.16	42.03	75.19
0.046	16.30	Average	H	17.88	0.02	34.20	-45.80	34.35	80.15
0.067	21.40	Average	H	17.85	0.03	39.28	-40.72	31.08	71.80
0.074	9.30	Average	H	17.84	0.03	27.17	-52.83	30.22	83.05
0.212	12.90	Average	H	17.80	0.16	30.86	-49.14	21.08	70.22

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)
95.96	33.10	Peak	H	16.50	-25.57	24.03	43.50	19.47
125.79	36.10	Peak	H	14.80	-25.53	25.37	43.50	18.13
151.01	38.90	Peak	H	13.90	-25.60	27.20	43.50	16.30
327.06	33.70	Peak	H	19.82	-25.25	28.27	46.00	17.73
465.53	36.10	Peak	V	22.21	-25.00	33.31	46.00	12.69
Above 500.00	Not detected	-	-	-	-	-	-	-

SSB Antenna

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	28.80	Average	H	18.23	0.01	47.04	-32.96	42.03	74.99
0.048	18.50	Average	H	17.87	0.02	36.39	-43.61	33.98	77.59
0.067	21.80	Average	H	17.85	0.03	39.68	-40.32	31.08	71.40
0.376	29.70	Average	H	17.76	0.24	47.70	-32.30	16.10	48.40
0.627	20.00	Quasi-Peak	H	17.80	0.38	38.18	-1.82	**31.66**	33.48
0.877	15.00	Quasi-Peak	H	18.00	0.51	33.51	-6.49	28.74	35.23

Above 30 ㎒

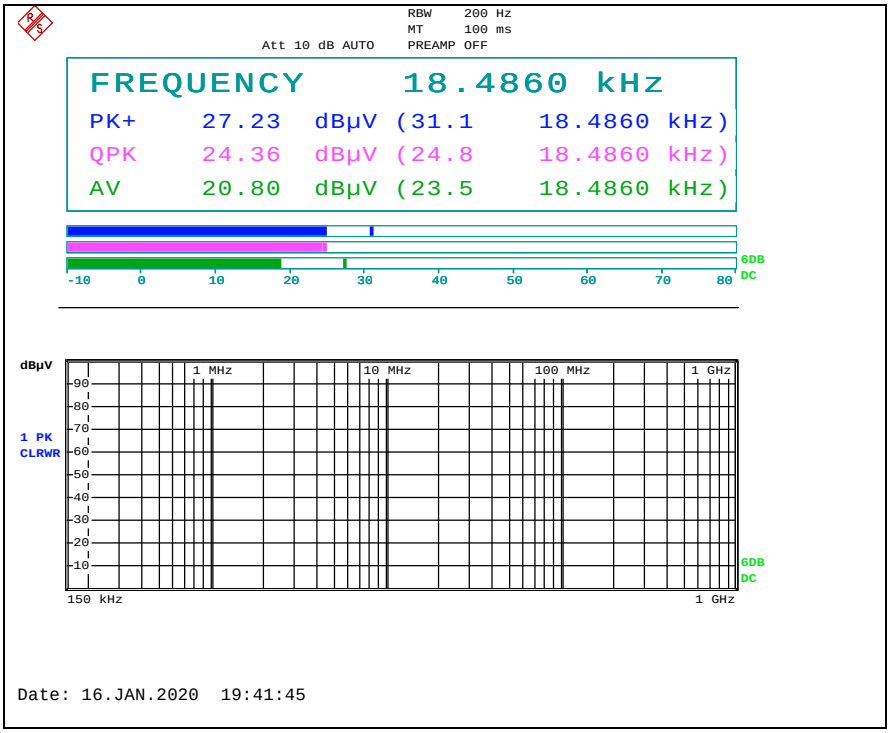
Radiated Emissions			Ant	Correction Factors		Total	Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP + CL (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
45.04	29.70	Peak	H	20.60	-26.78	23.52	40.00	16.48
125.79	35.40	Peak	H	14.80	-25.53	24.67	43.50	18.83
151.01	37.50	Peak	H	13.90	-25.60	25.80	43.50	17.70
411.45	32.90	Peak	H	21.83	-25.18	29.55	46.00	16.45
462.86	35.30	Peak	V	22.11	-25.04	32.37	46.00	13.63
Above 500.00	Not detected	-	-	-	-	-	-	-

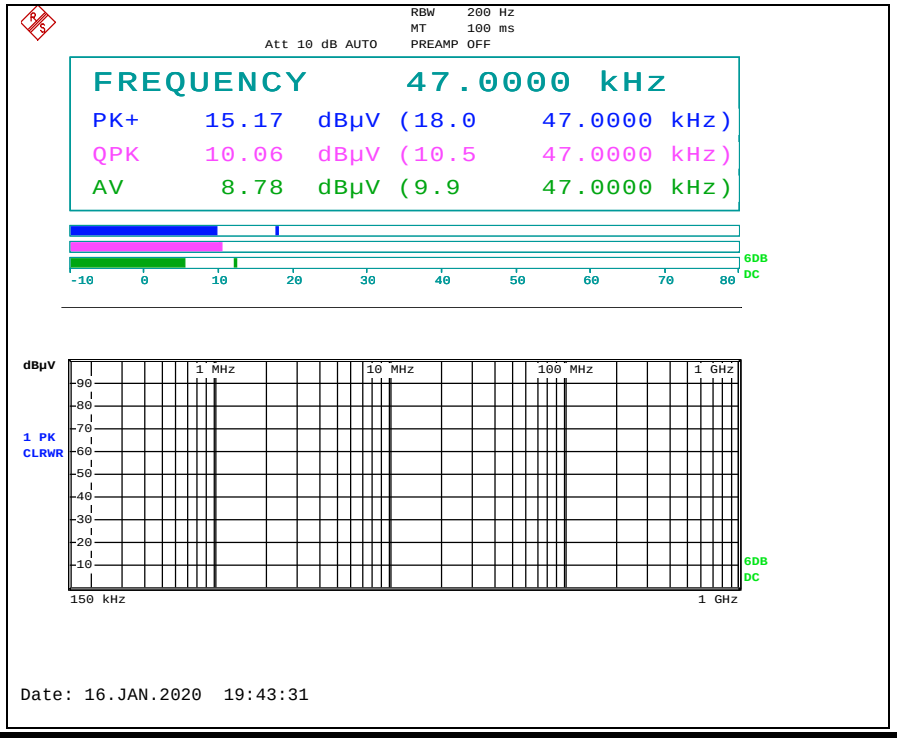
Remark;

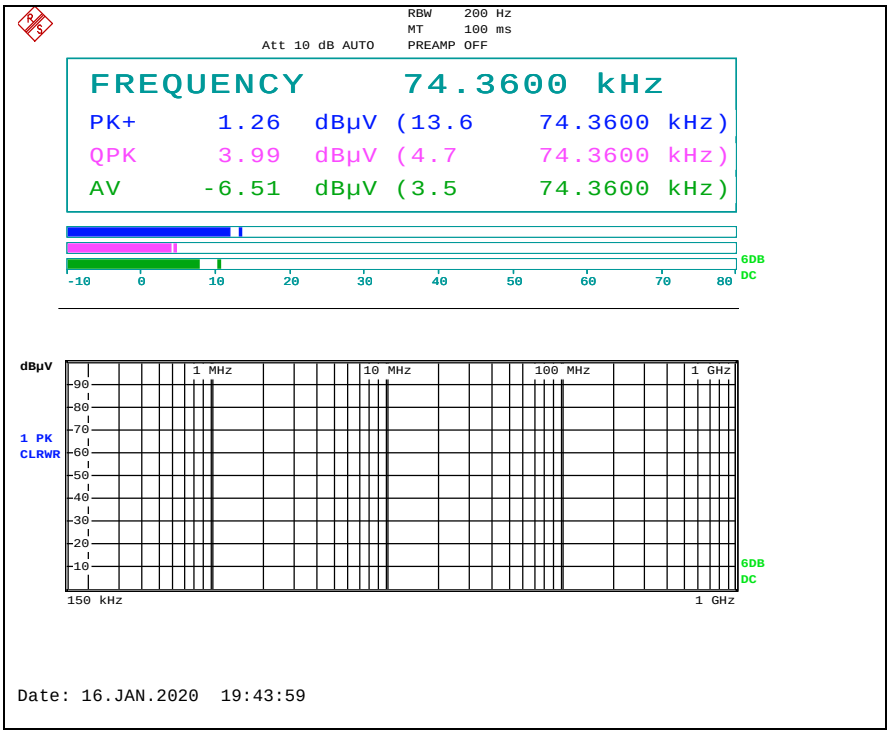
1. According to §15.31(f)(2)
   - 300 m Result (dBμV/m) = 3 m Result (dBμV/m) - 40log (300/3) (dBμV/m)
   - 30 m Result (dBμV/m) = 3 m Result (dBμV/m) - 40log (30/3) (dBμV/m)
2. According to field strength table of general requirement in §15.209(a), field strength limits below 1.705 ㎒ were calculated as below.
   - 9 ㎑ to 490 ㎑: 20log (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 1 000 ㎒ in these three bands on measurements employing an average detector.
4. According to ANSI C63.10: 2013, For measurement below 30 ㎒.
   conversion factor from E-field to H-field is considered as free-space impedance [1 μV/m = (1/377 Ω) × 1 μA/m]
   The FCC limits are same to the IC limits.
5. The limit above was calculated based on table of §15.209 (a).
6. Actual (dBμV/m) at 3 m = Reading (dBμV) + AF (dB/m) + CL (dB) or
   Reading (dBμV) + AF (dB/m) + AMP (dB) + CL (dB).

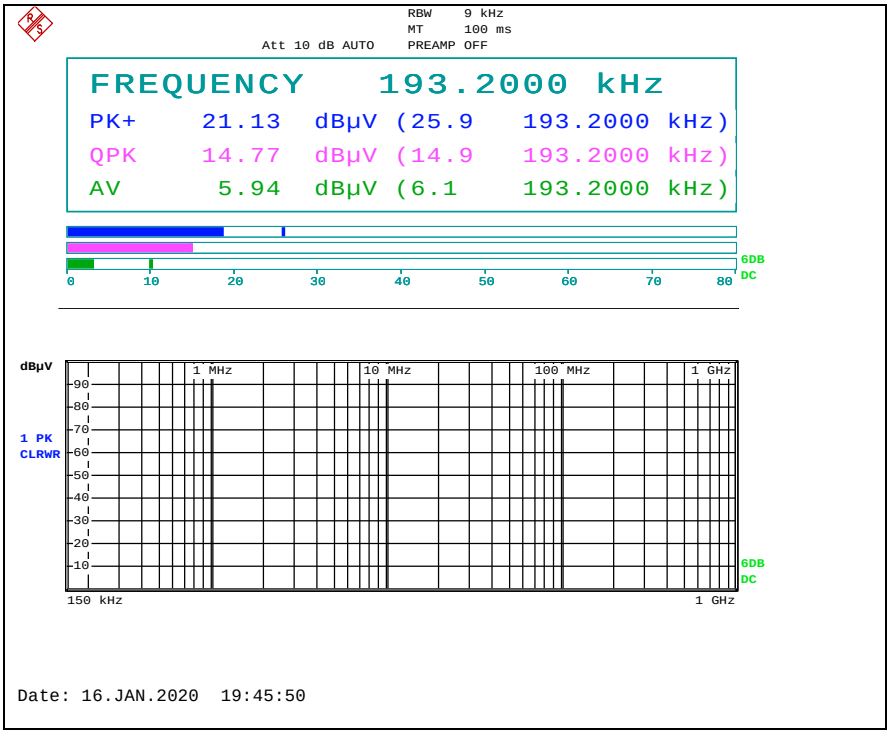
- Test plots

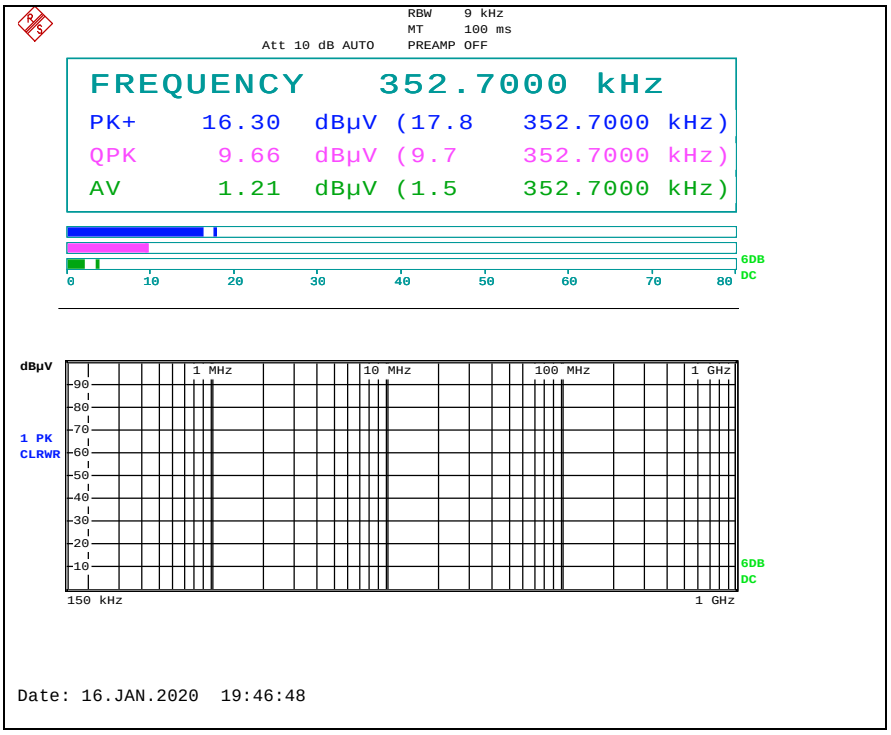
- DRV Antenna



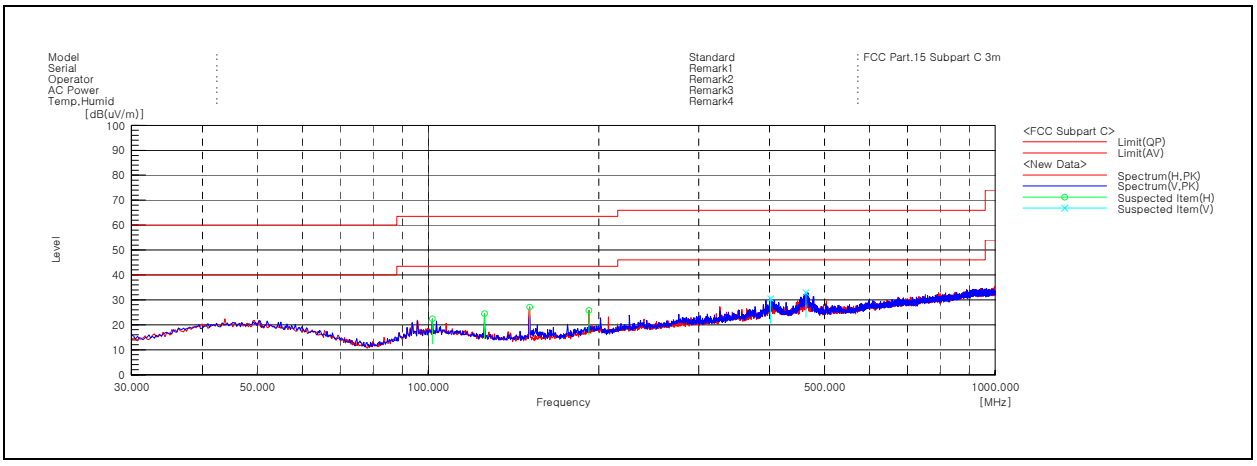








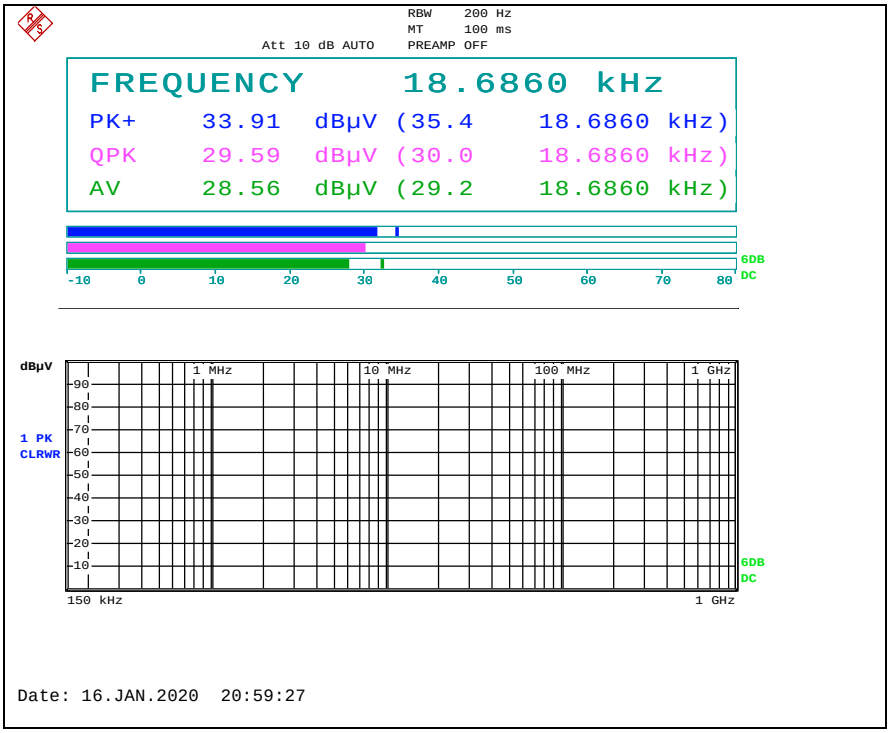
Above 30 ㎒

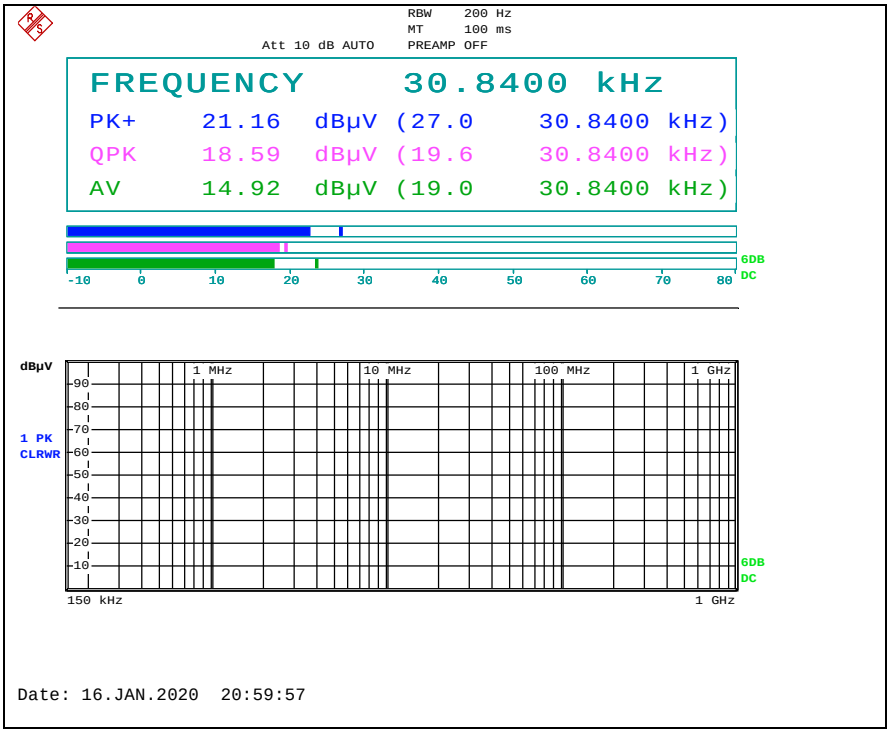


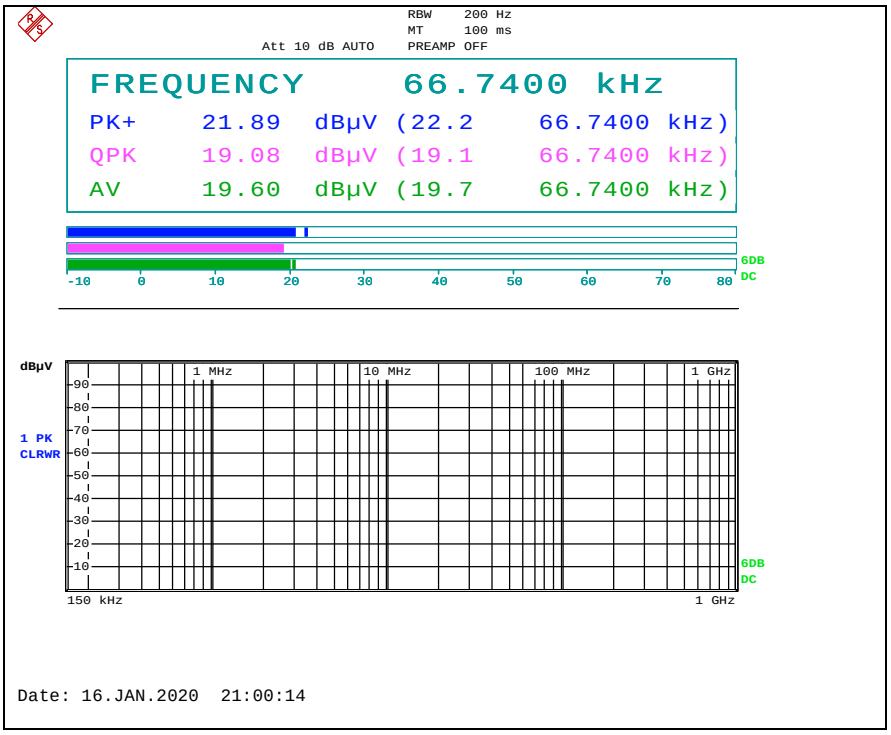
Remark;

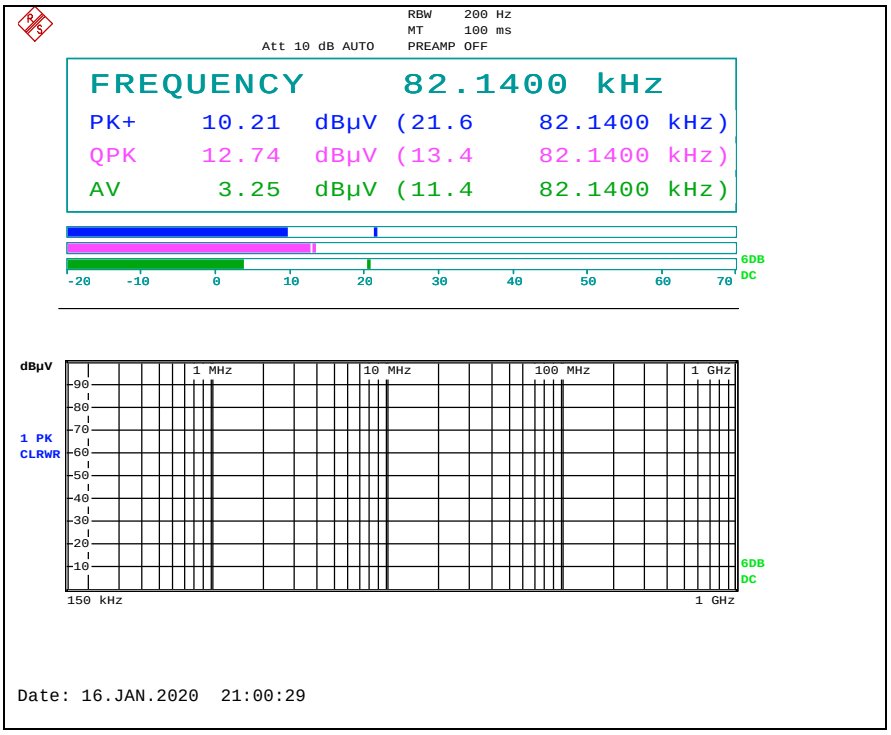
- Traces shown in the plot were made by using a peak detector.

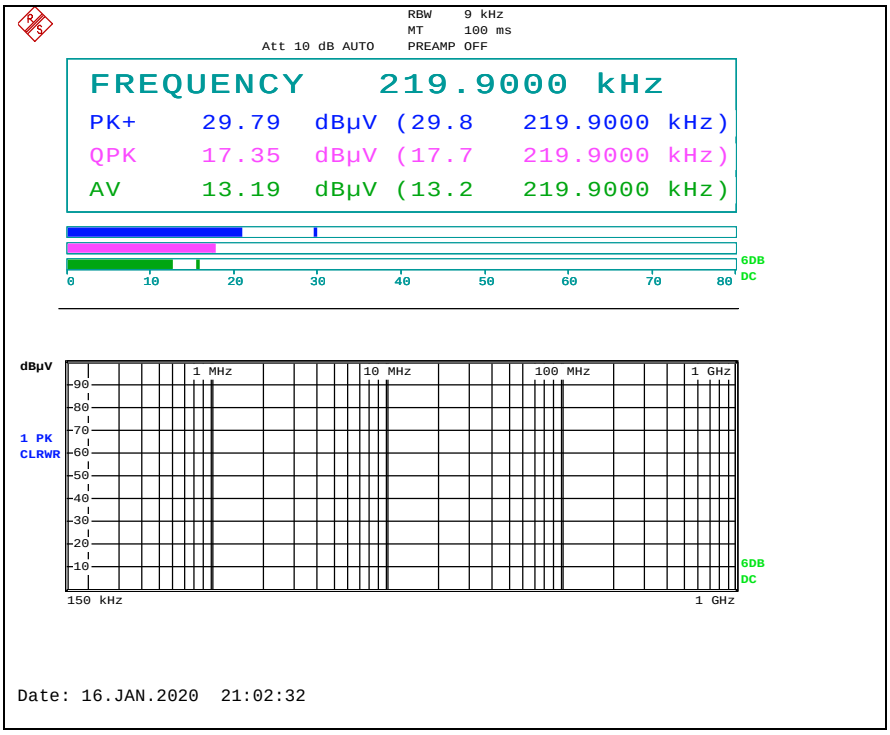
- AST Antenna



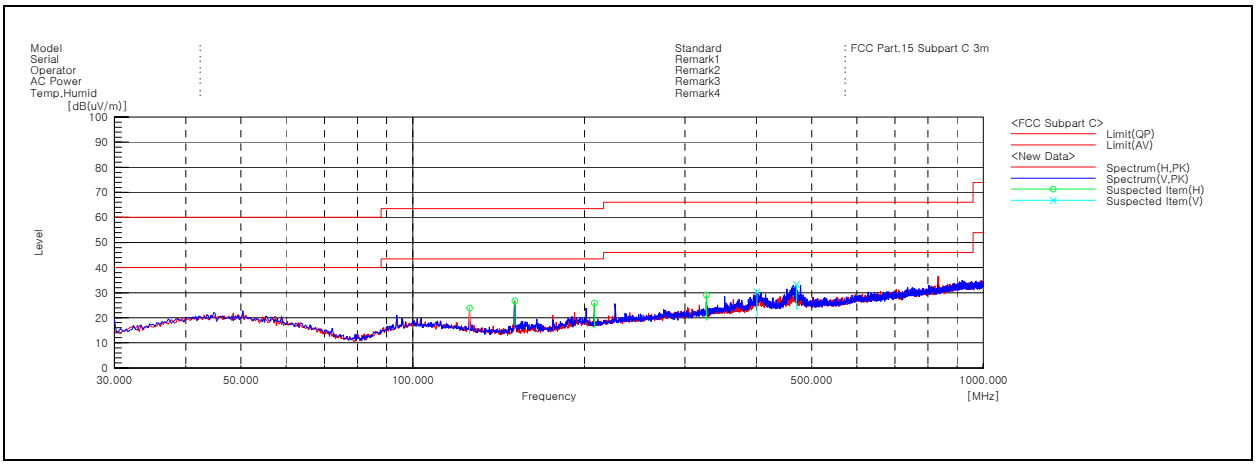








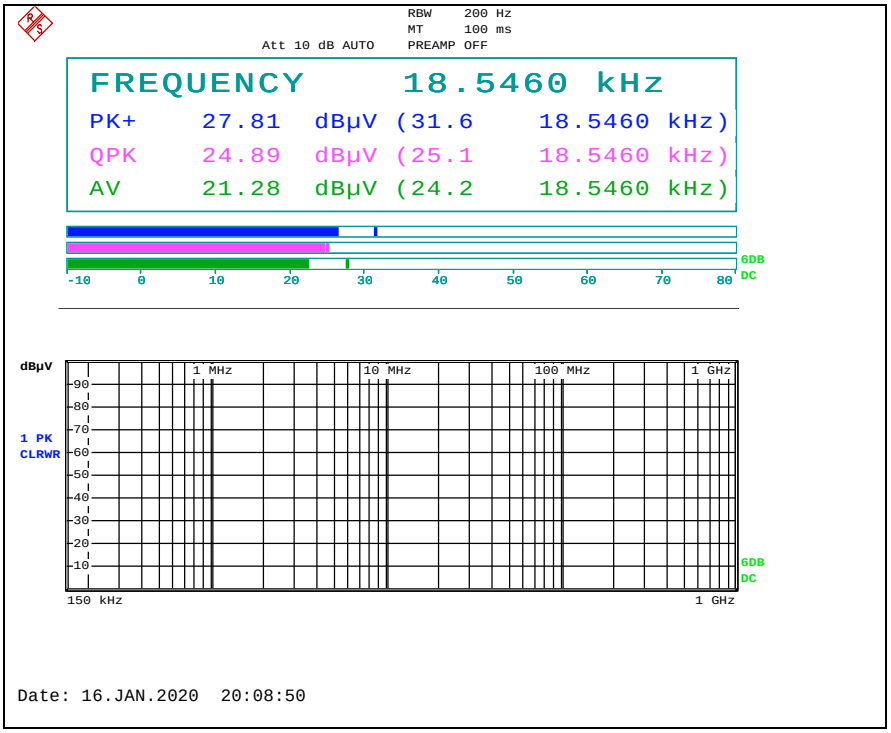
Above 30 ㎒

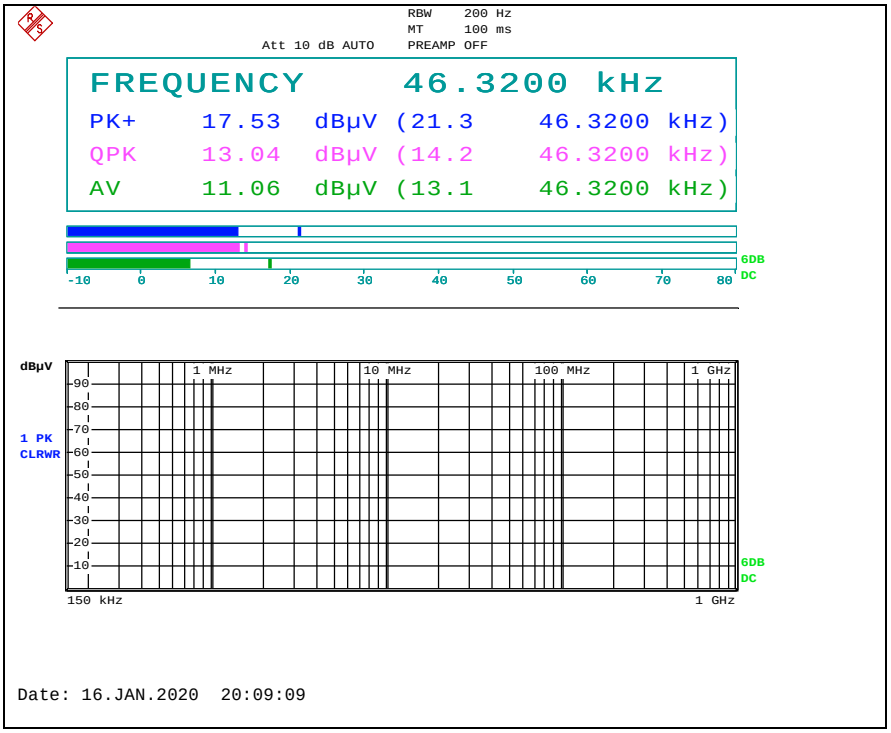


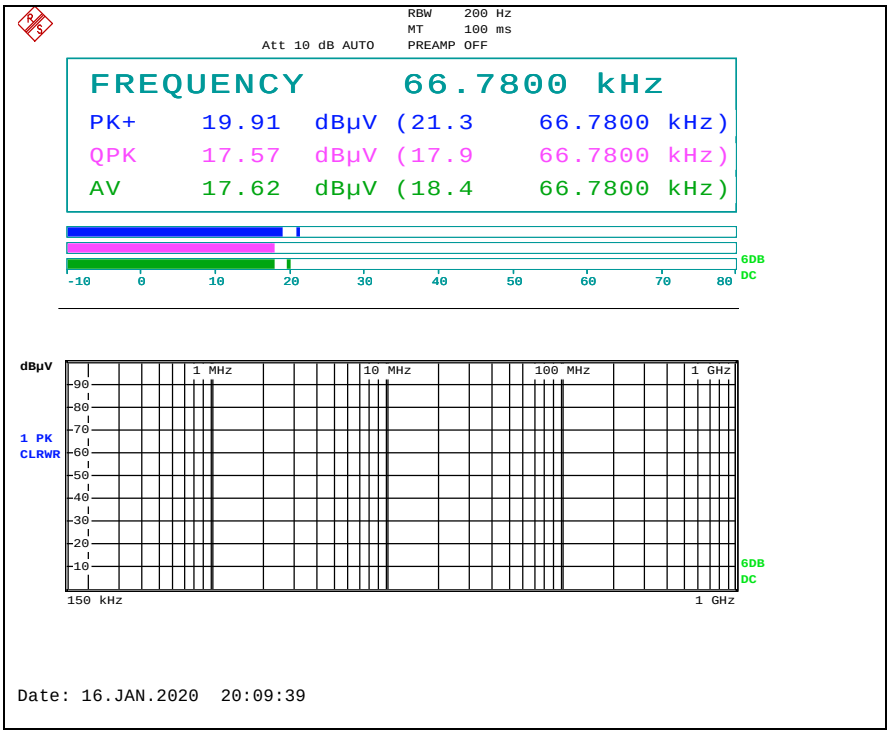
Remark;

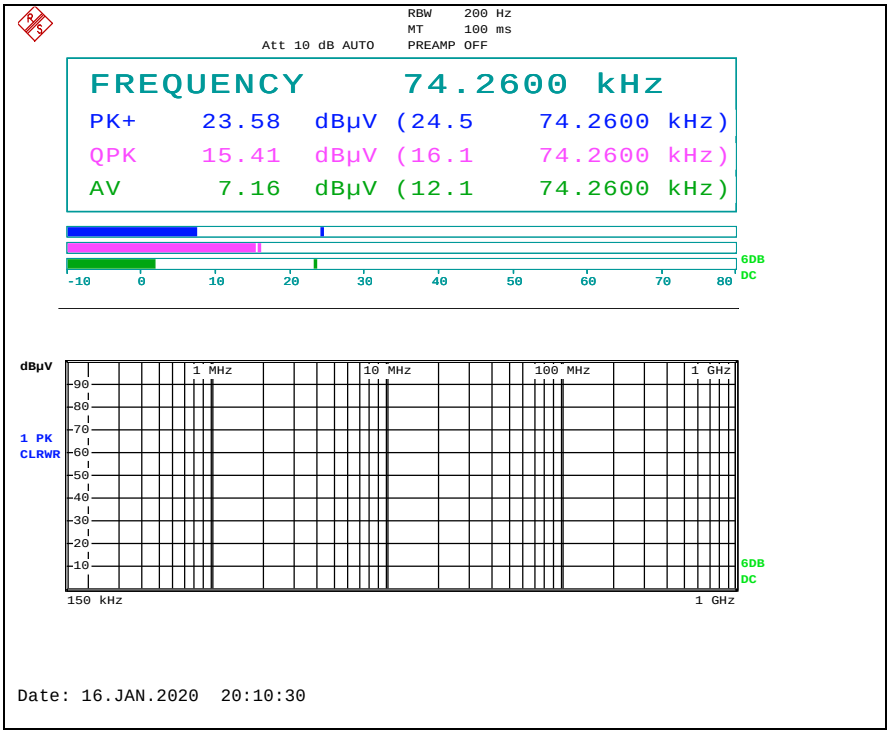
- Traces shown in the plot were made by using a peak detector.

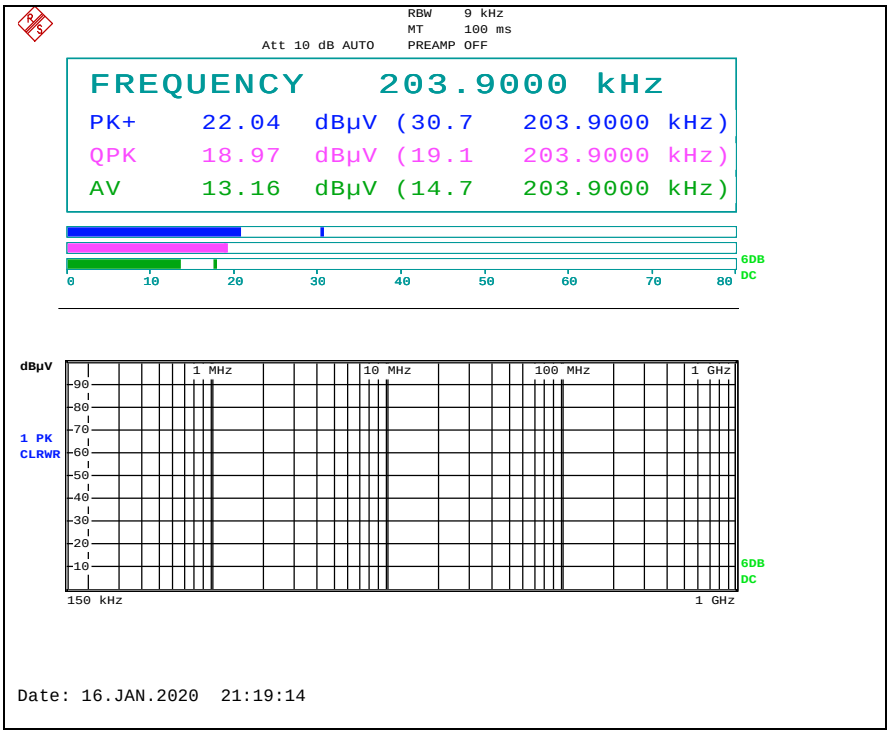
- INT1 Antenna



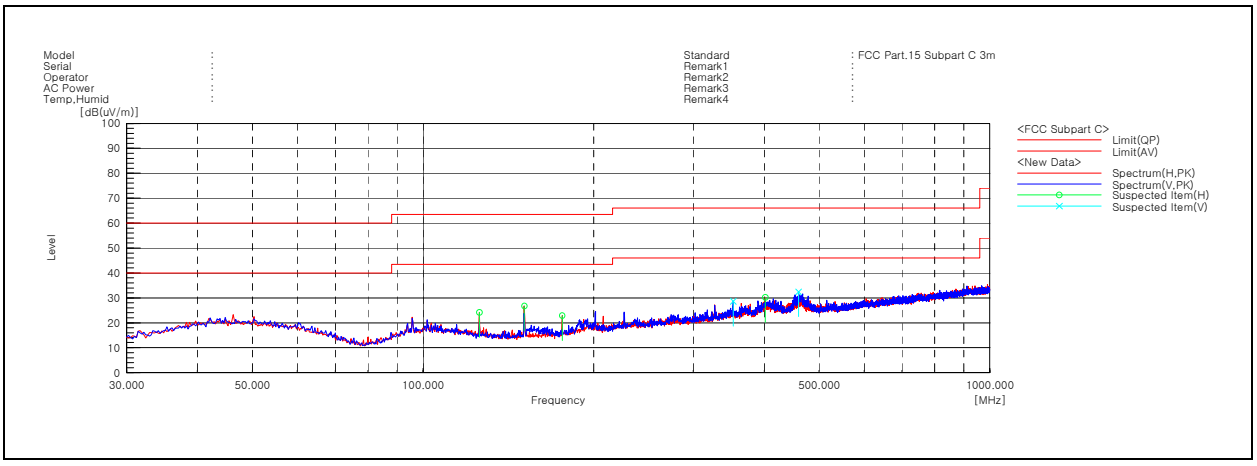








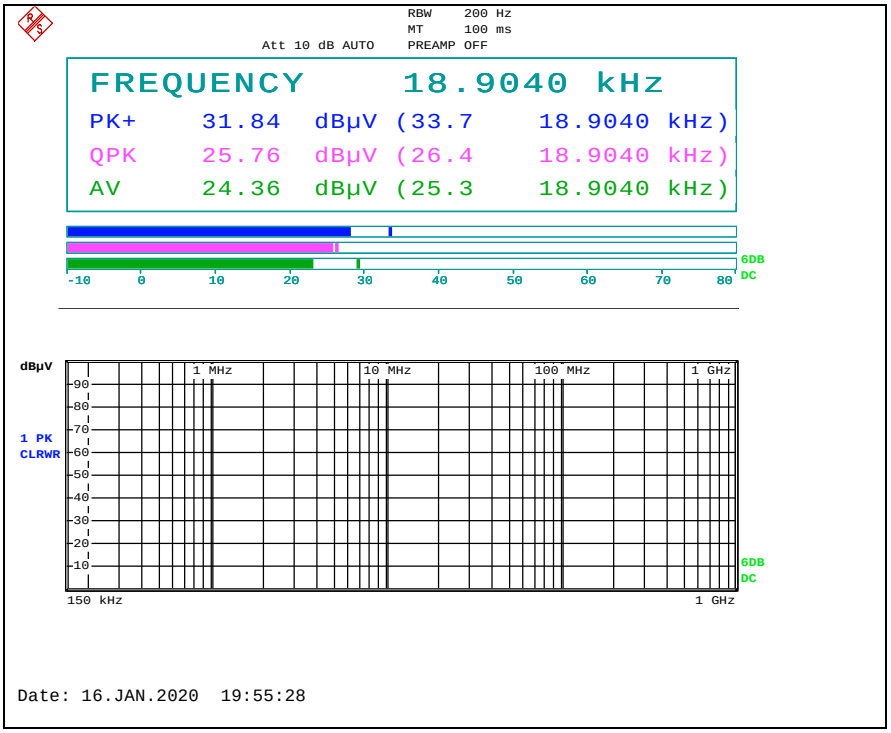
Above 30 ㎒

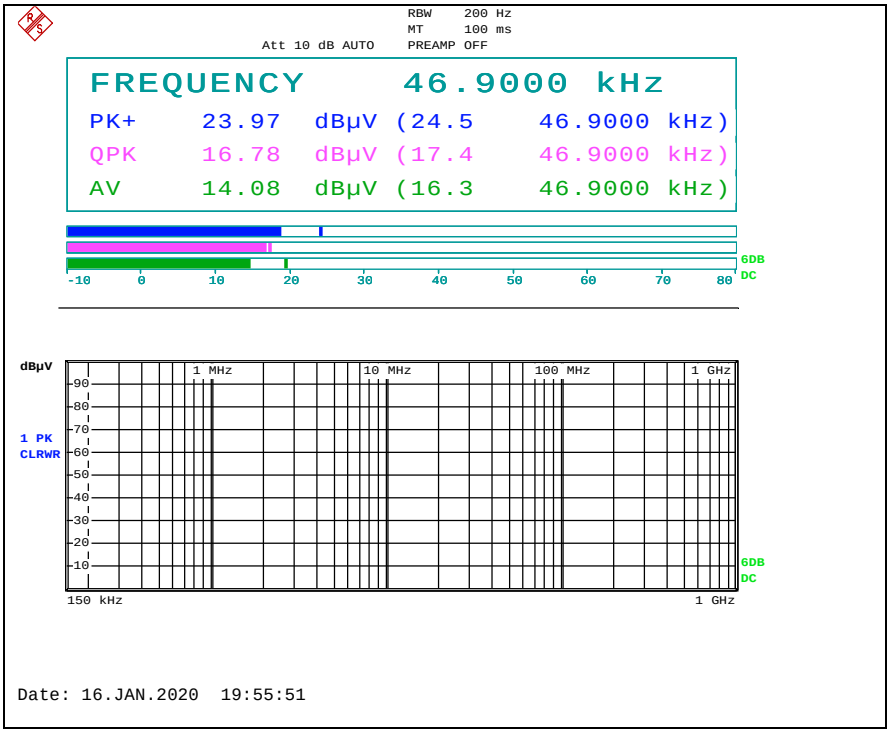


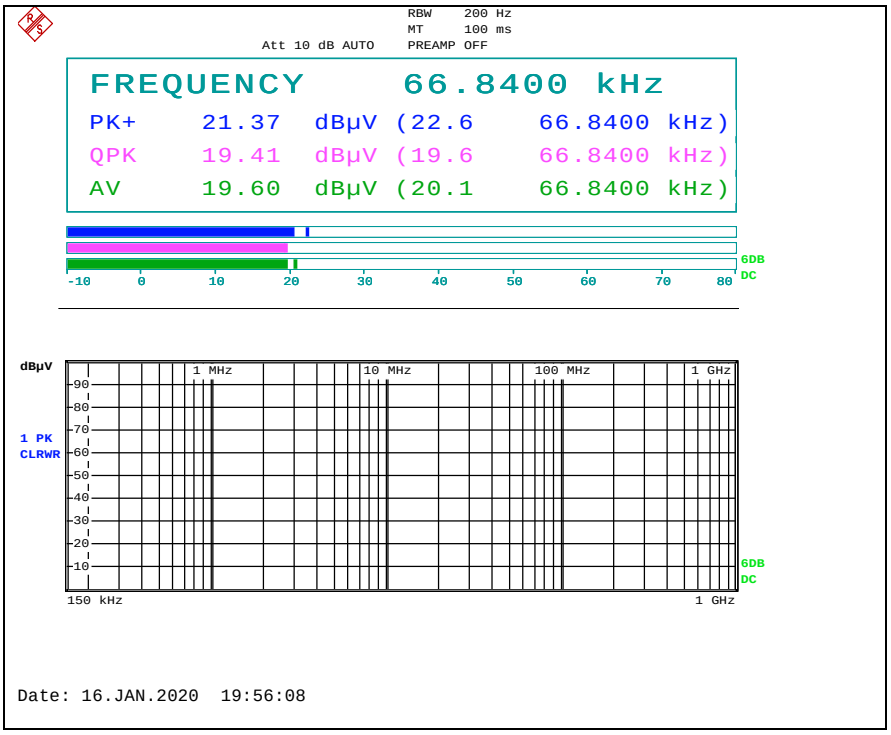
Remark;

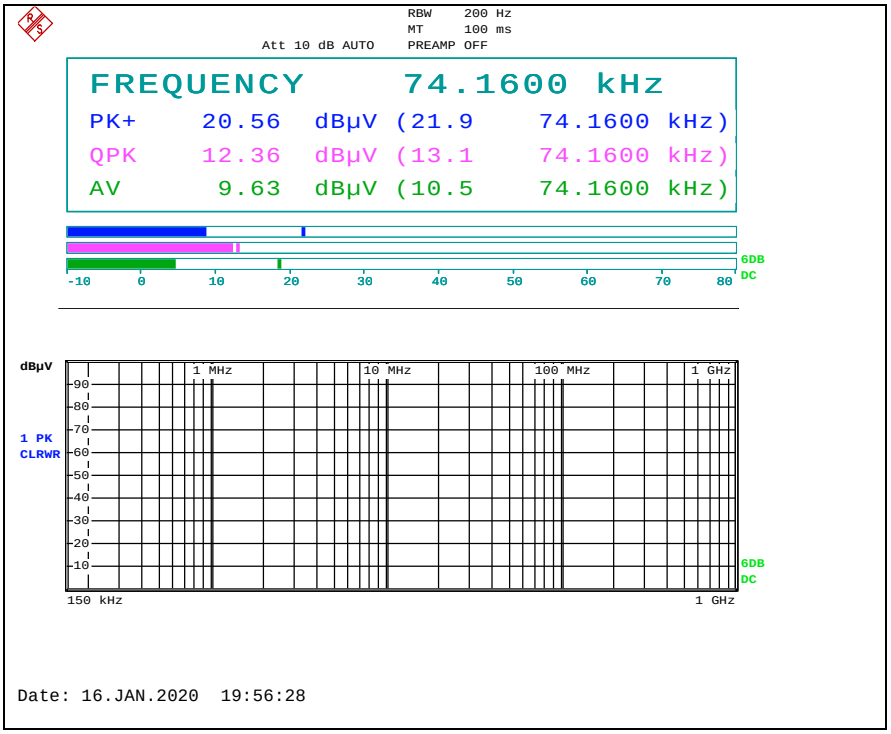
- Traces shown in the plot were made by using a peak detector.

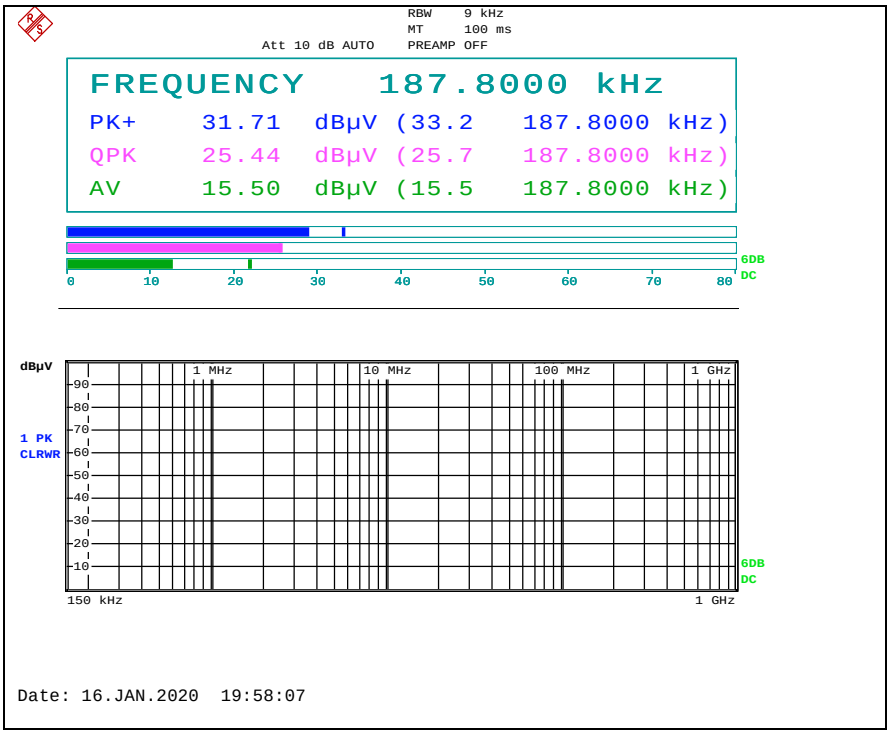
- INT2 Antenna

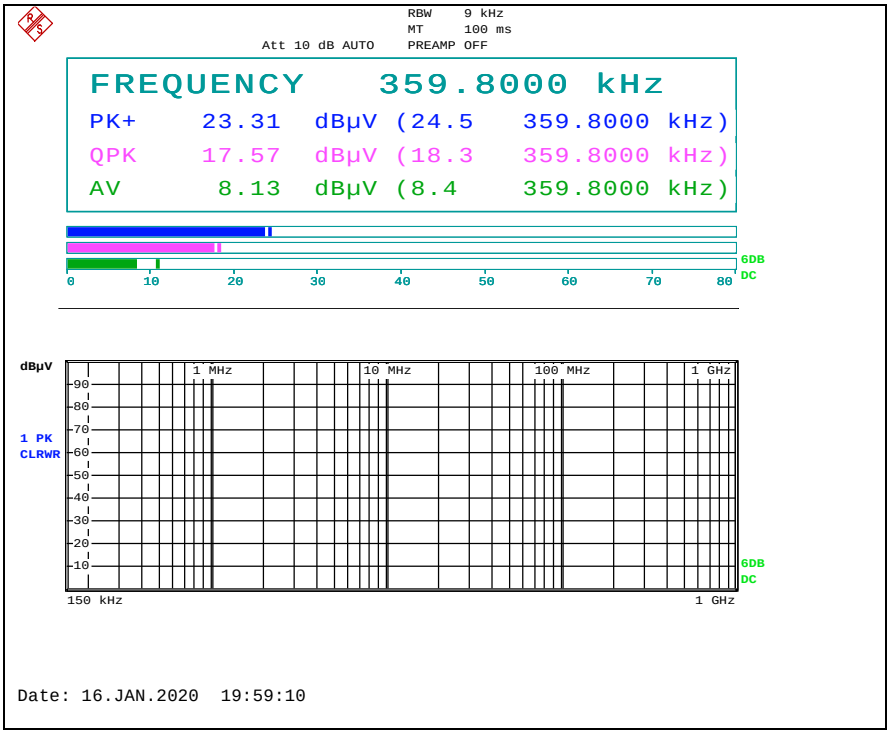




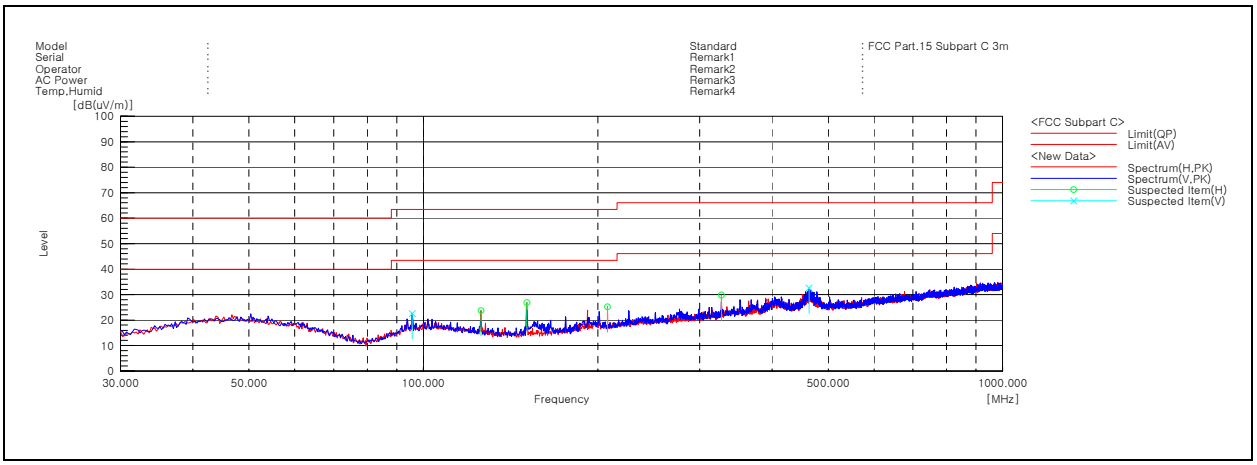








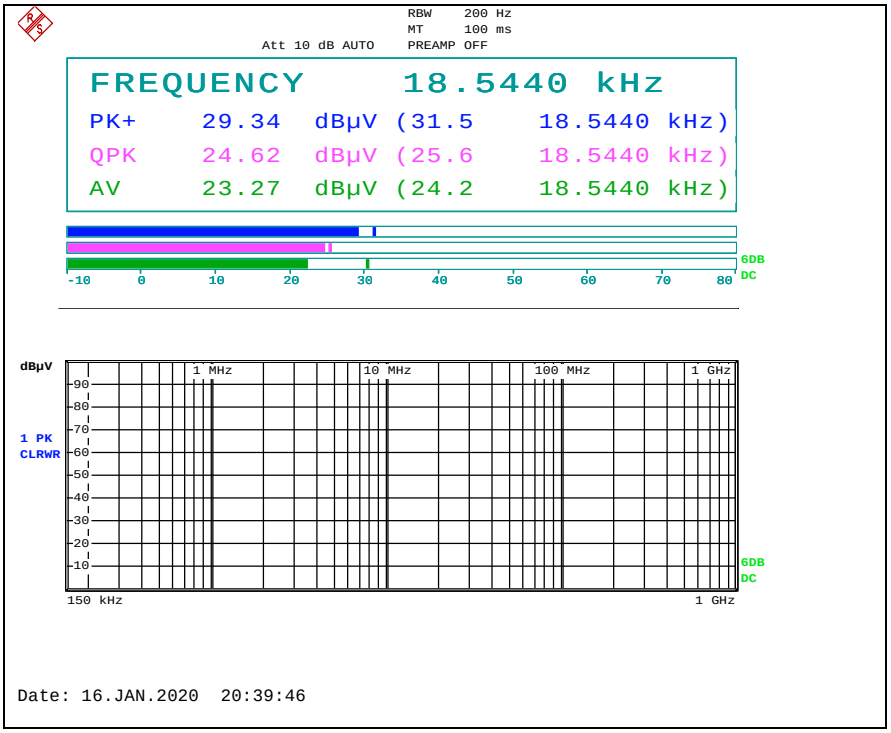
Above 30 ㎒

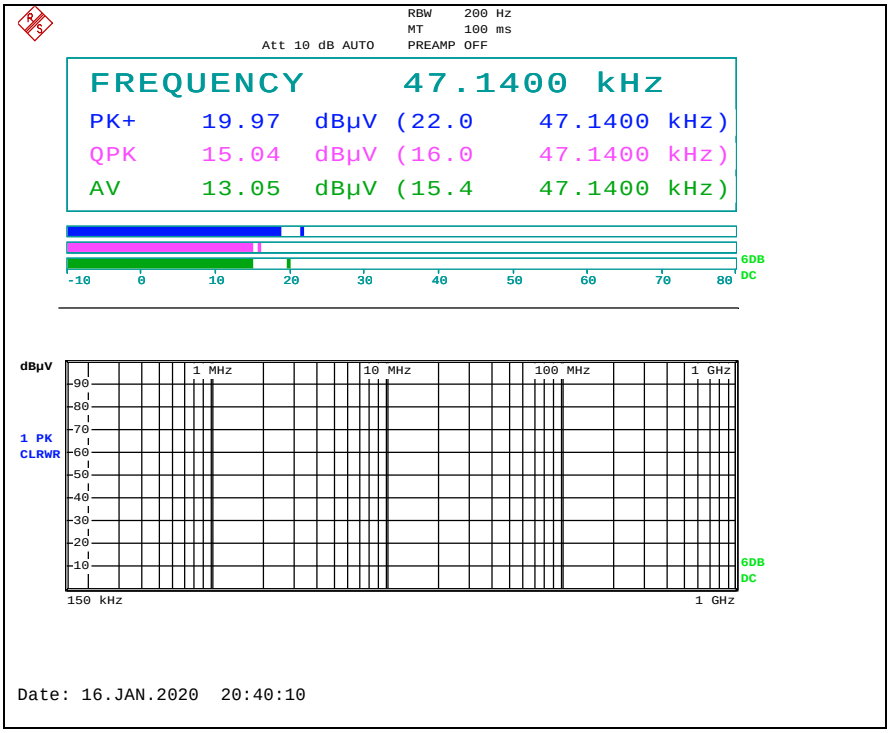


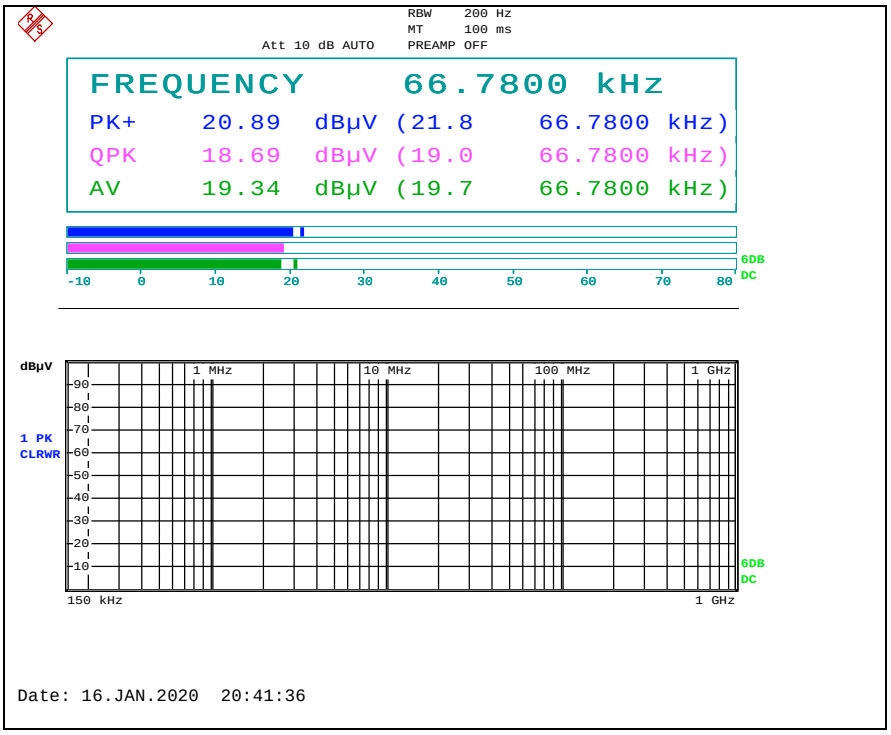
Remark;

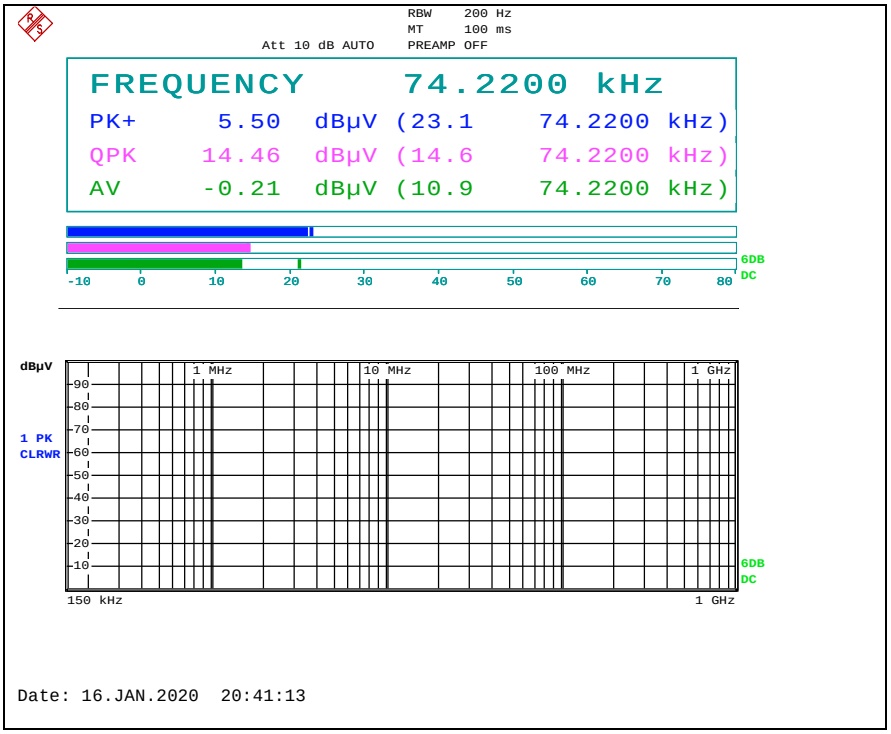
- Traces shown in the plot were made by using a peak detector.

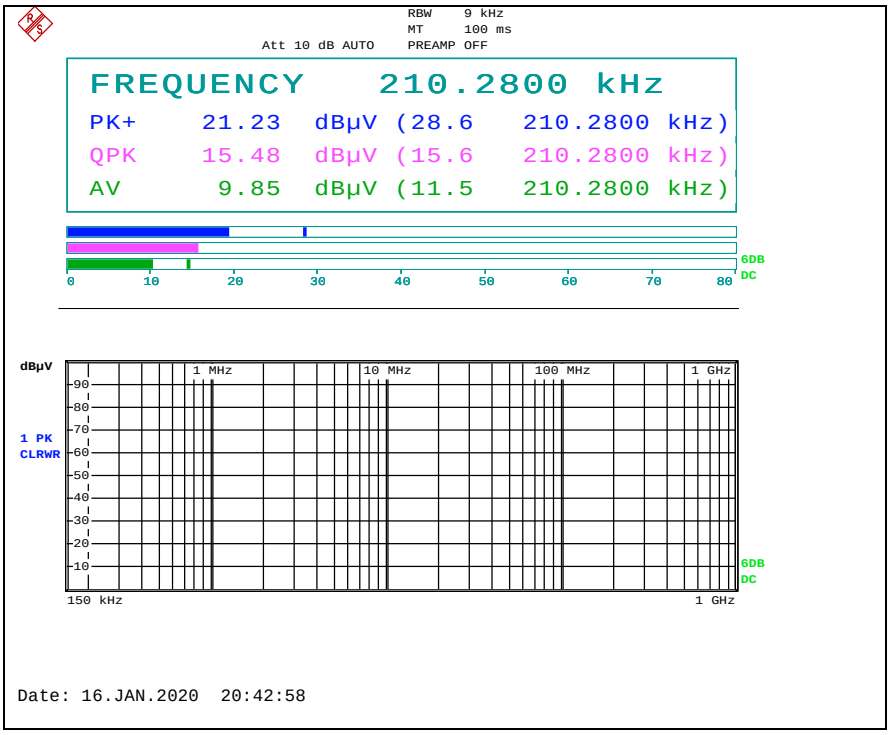
- TRK Antenna



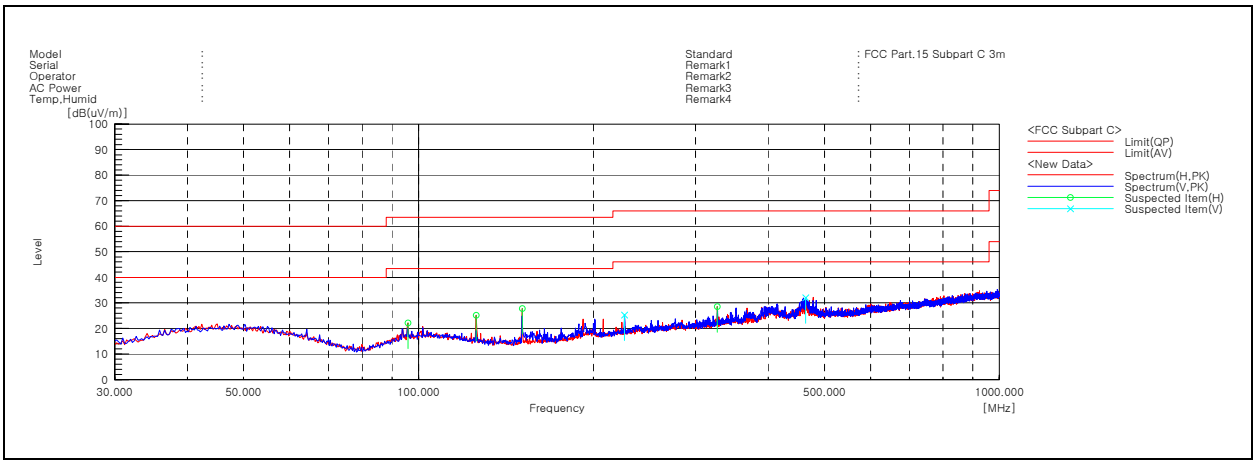








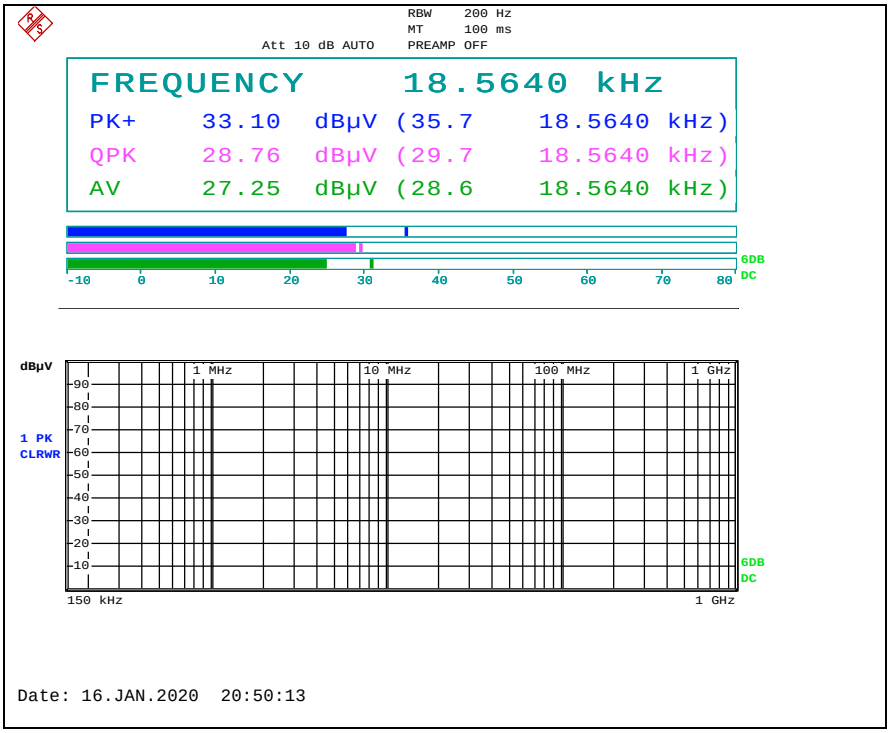
Above 30 ㎒

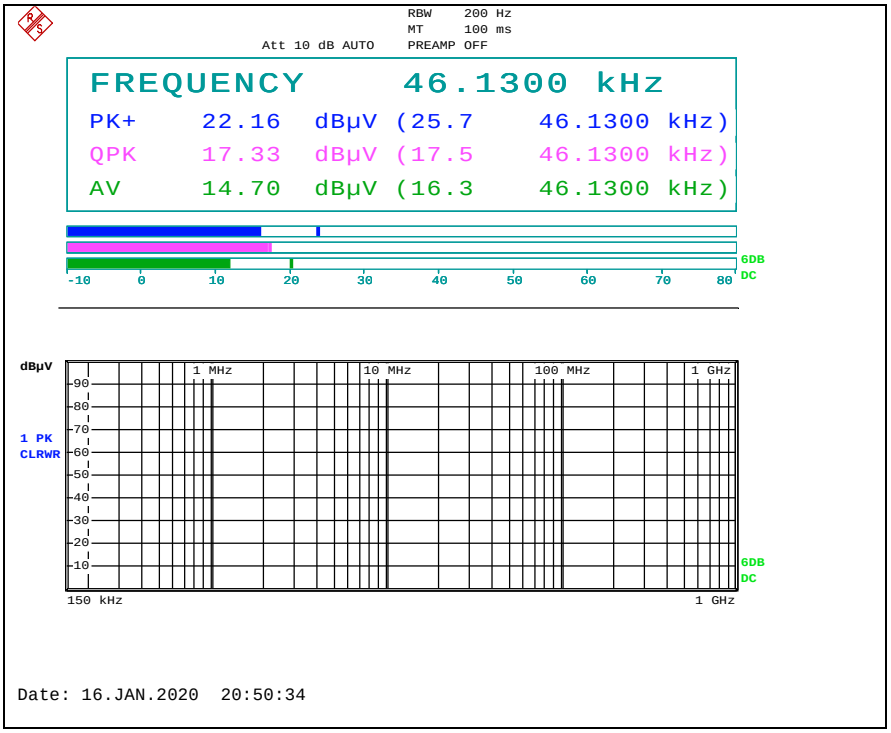


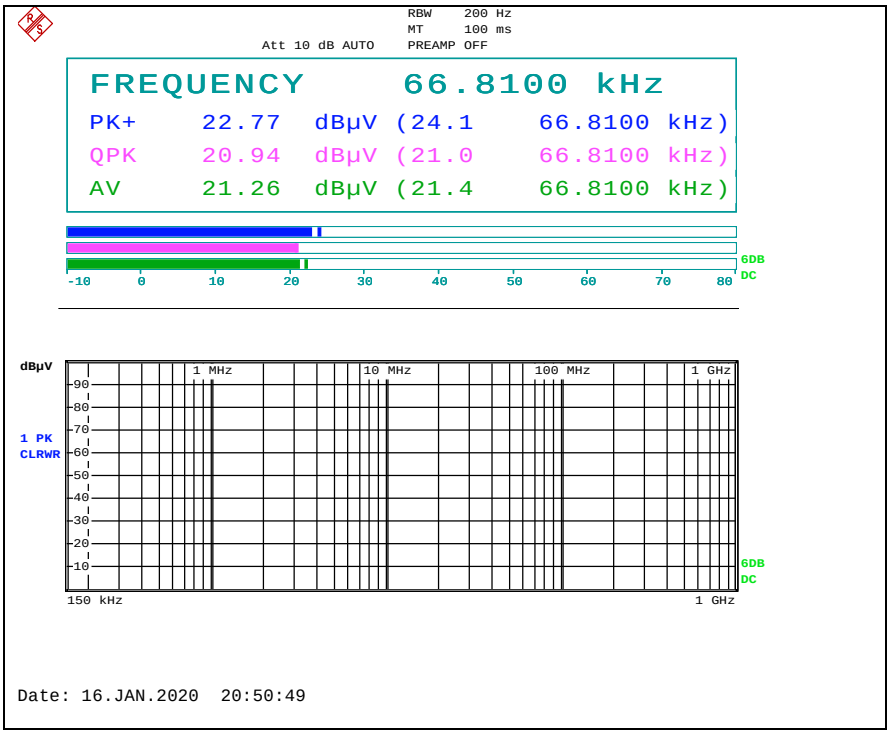
Remark;

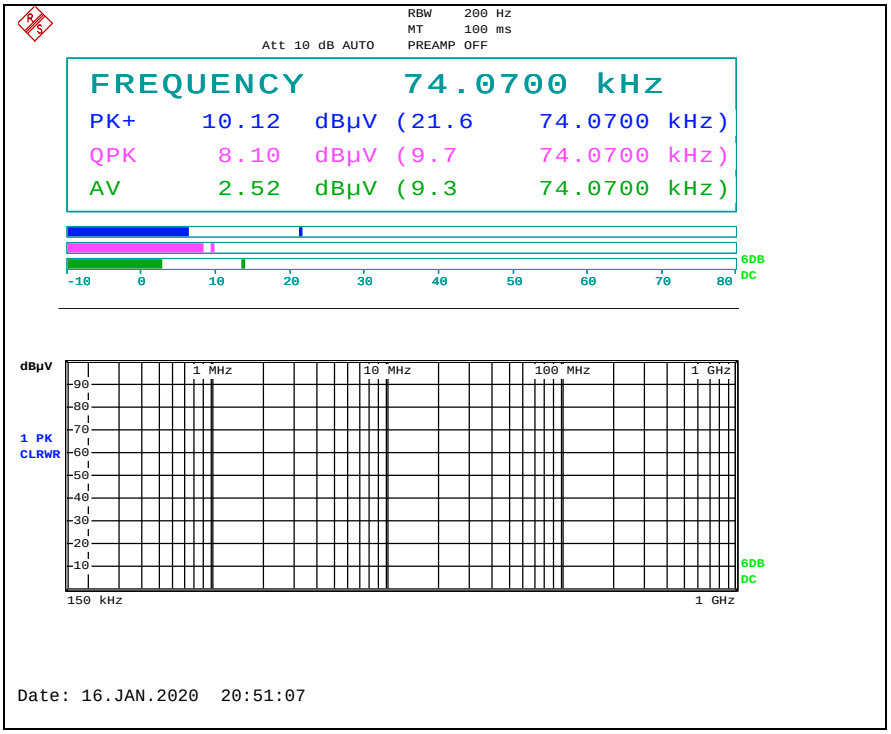
- Traces shown in the plot were made by using a peak detector.

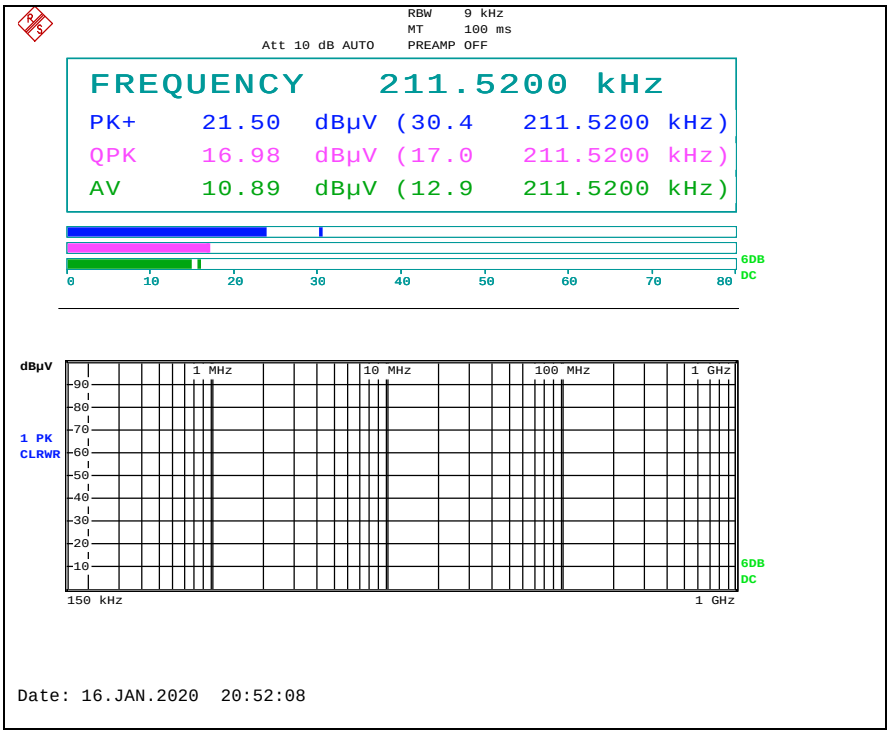
- BMP Antenna



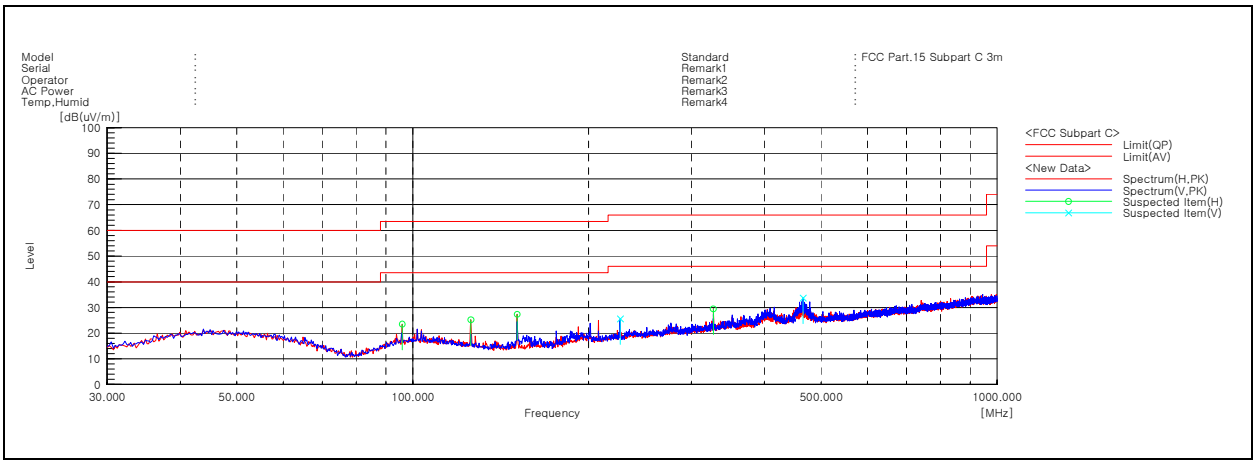








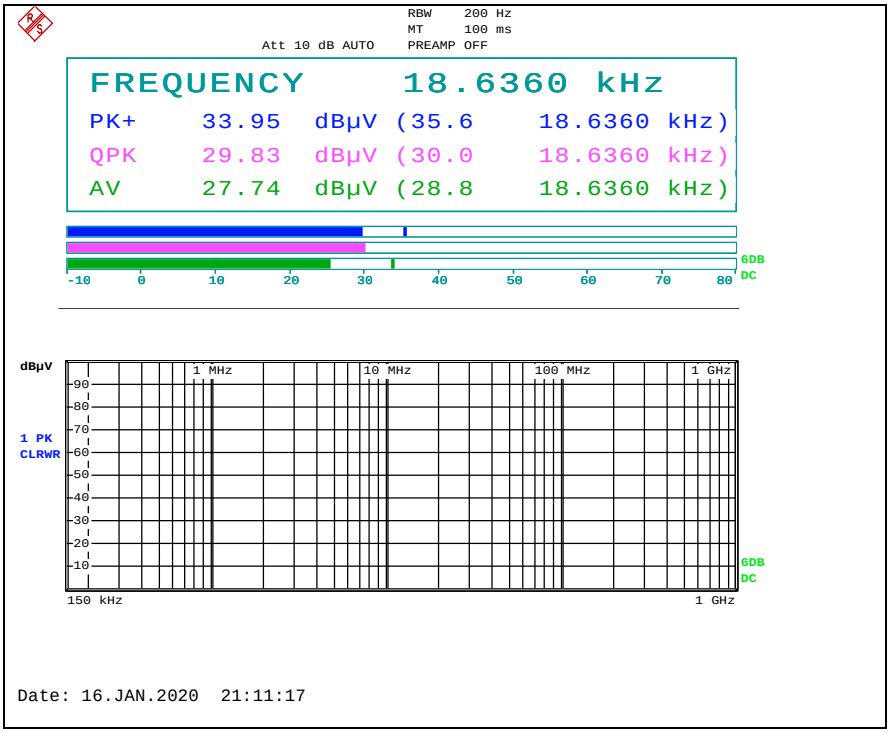
Above 30 ㎒

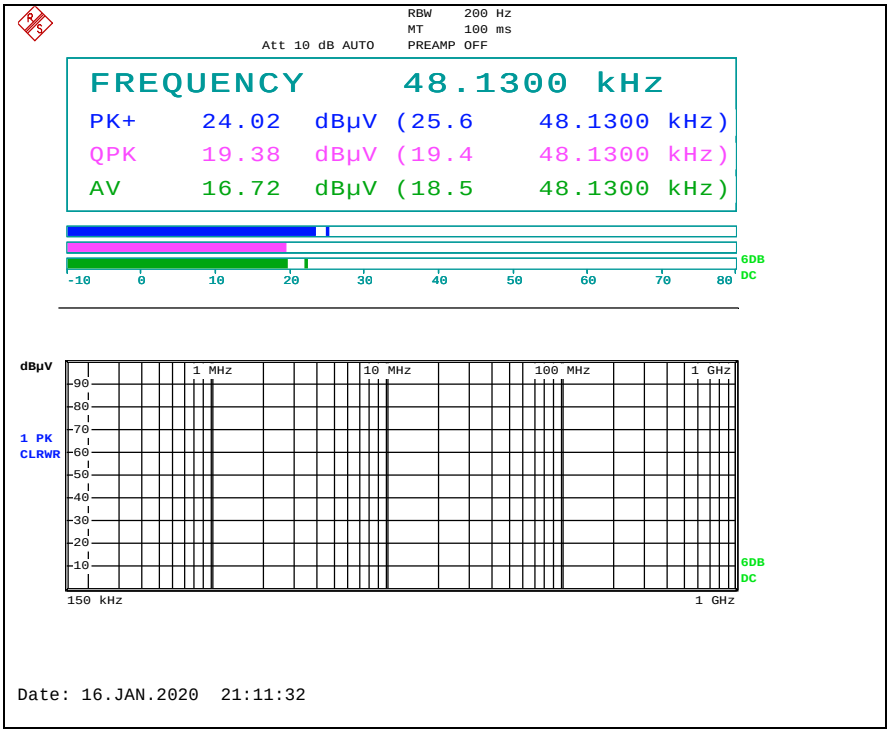


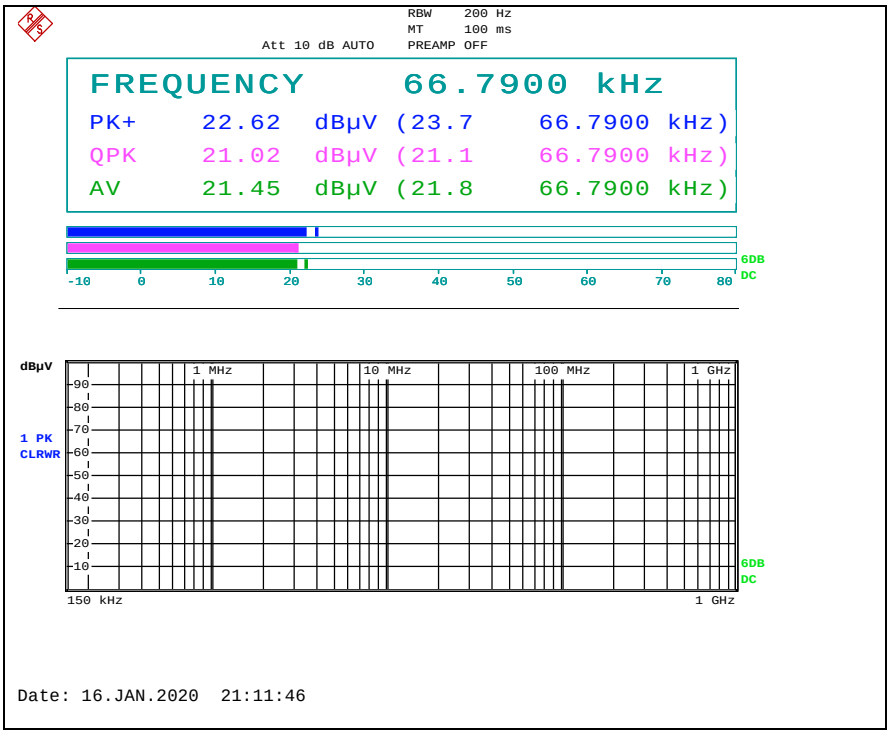
Remark;

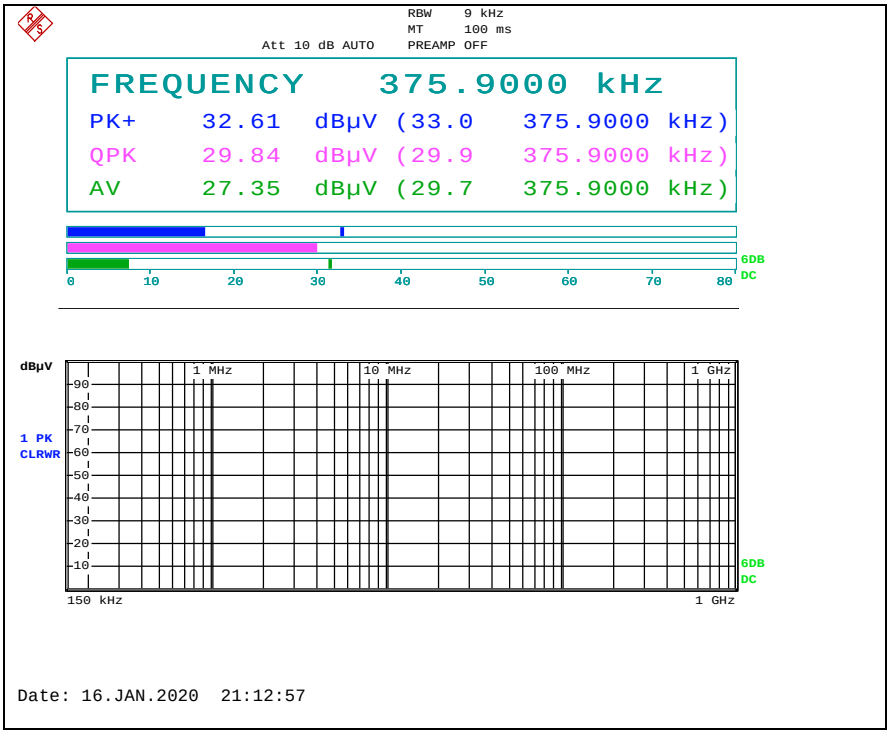
- Traces shown in the plot were made by using a peak detector.

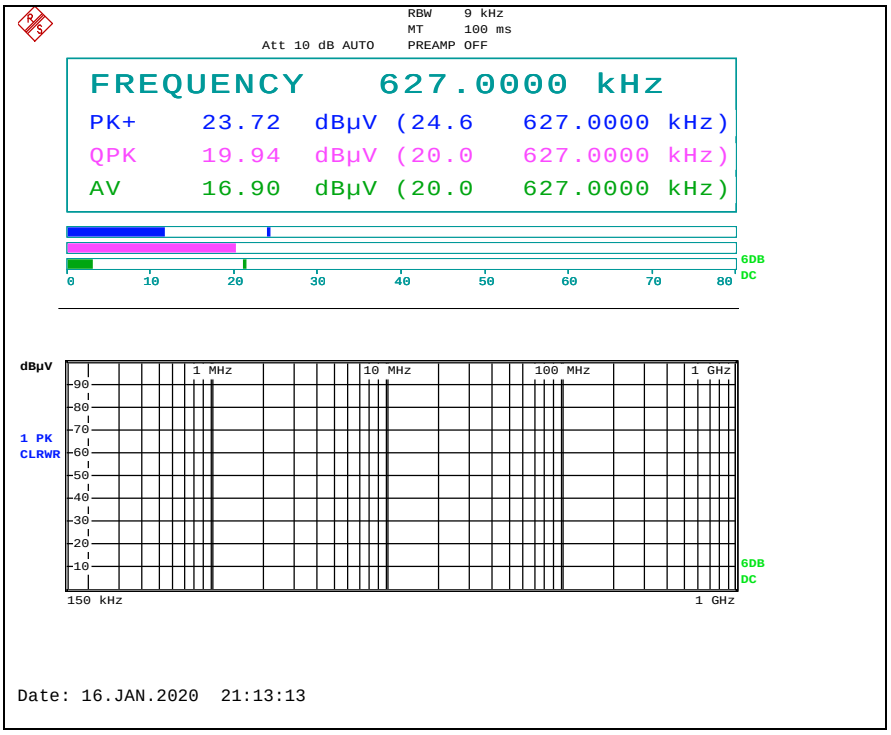
- SSB Antenna

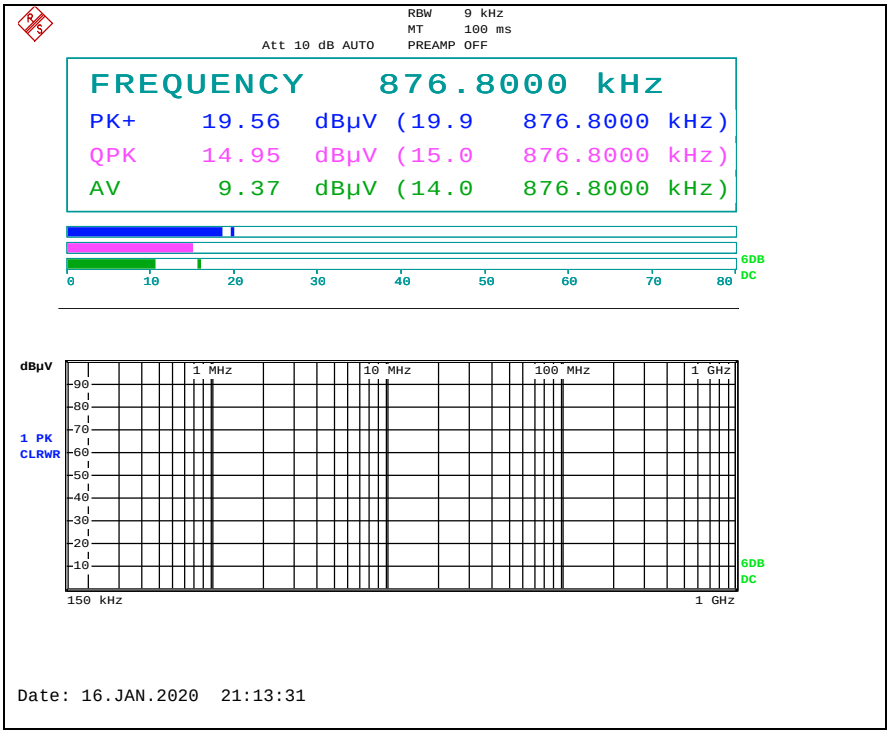




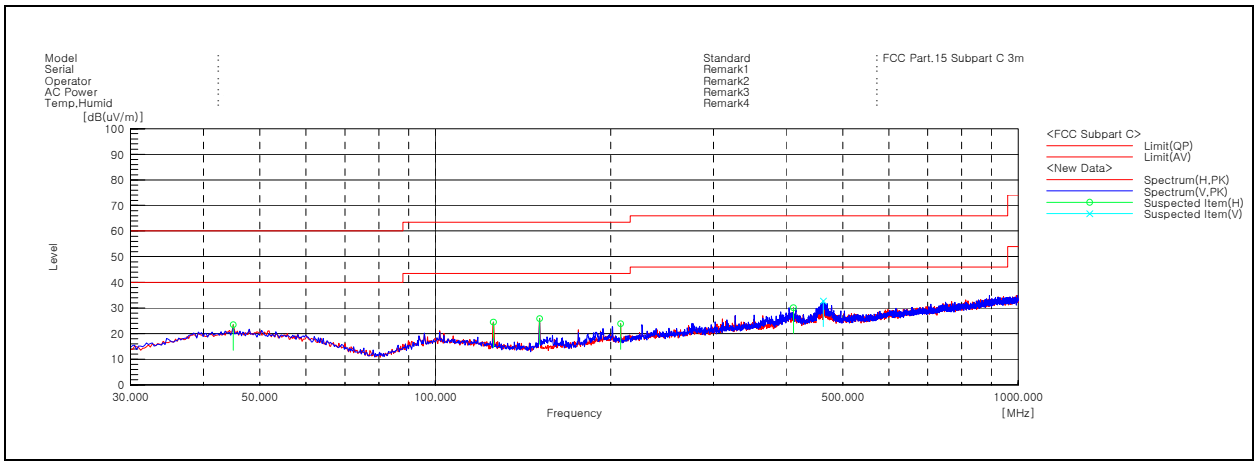








Above 30 ㎒

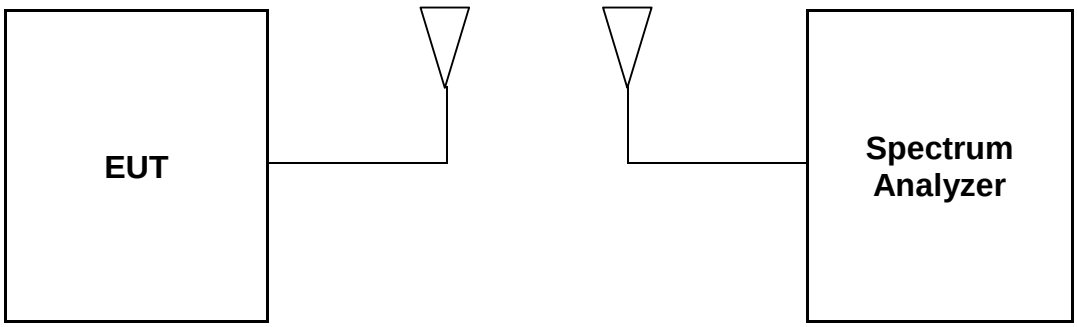


Remark;

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

3. 20 dB Bandwidth

3.1. Test Setup



3.2. Limit

None; for reporting purposed only

3.3. Test Procedure

1. Span = the spectrum analyzer shall be between two times and five times the OBW, RBW = 1% to 5% of the OBW, VBW = set approximately 3 x RBW, Sweep = auto, Detector = peak, Trace = max hold.
2. The marker-to-peak function to set the mark to the peak of the emission. Use the marker-delta function to measure 20 dB down one side of the emission. Reset the function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level.
   The marker-delta reading at this point is 20 dB bandwidth of the emission

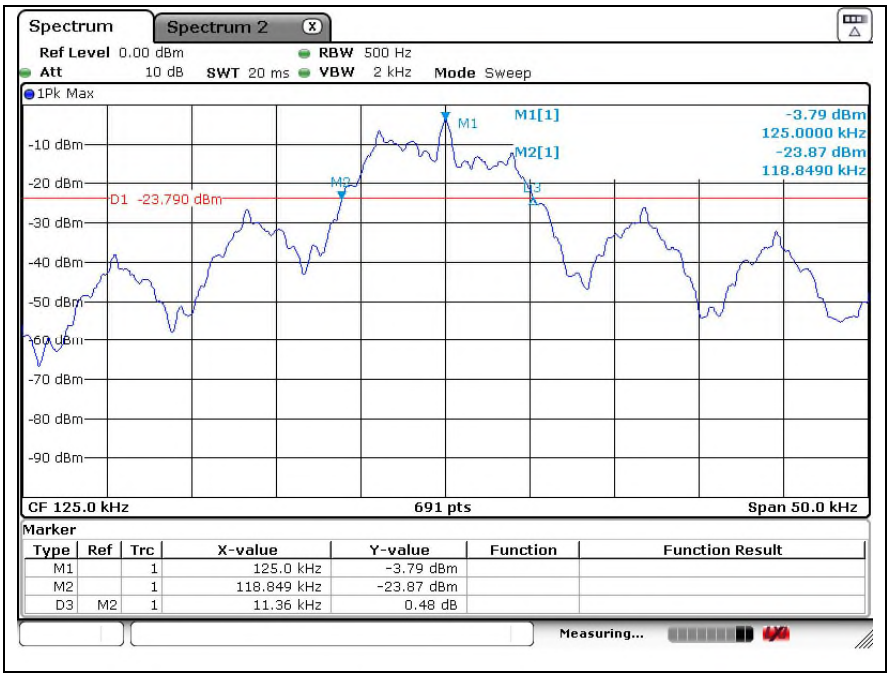
3.4. Test Result

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

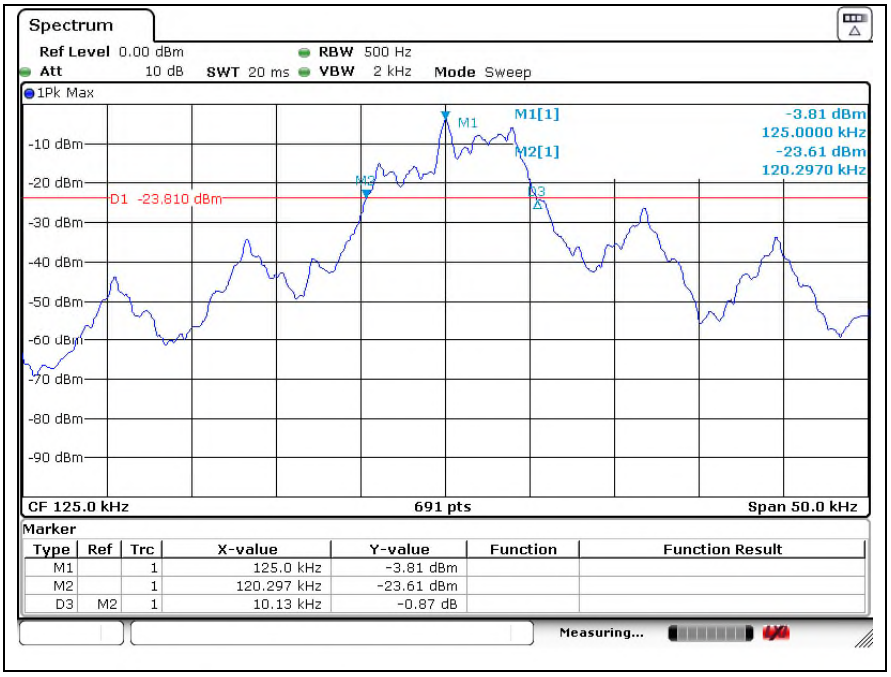
Test Antenna	Frequency (㎑)	20 ㏈ Bandwidth (㎑)	Limit
DRV Antenna	125	11.360	Reporting proposed only
AST Antenna	125	10.130	
INT1 Antenna	125	10.420	
INT2 Antenna	125	10.999	
TRK Antenna	125	10.203	
BMP Antenna	125	16.787	
SSB Antenna	125	21.635	

- Test plots

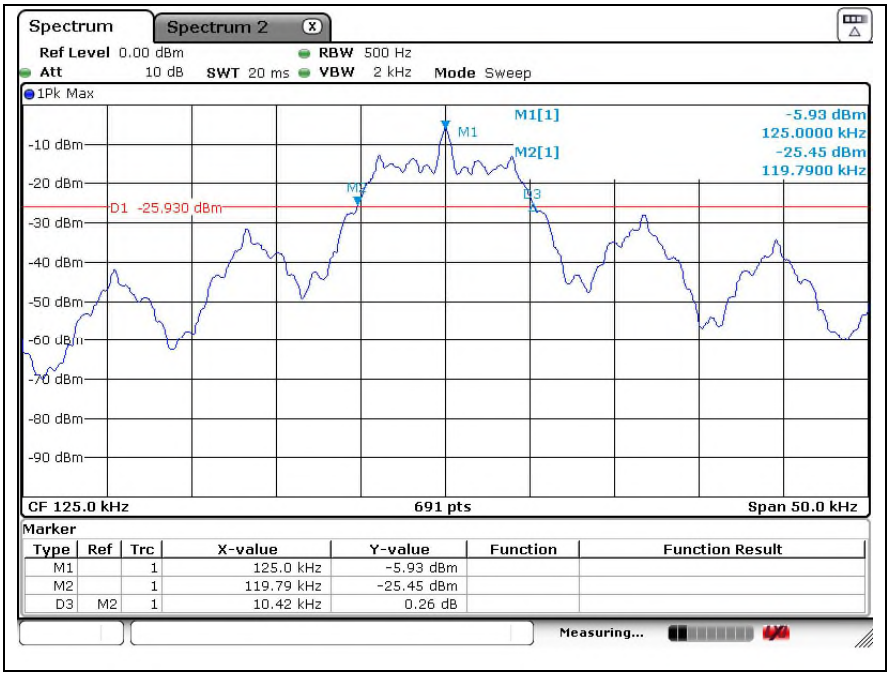
- DRV Antenna



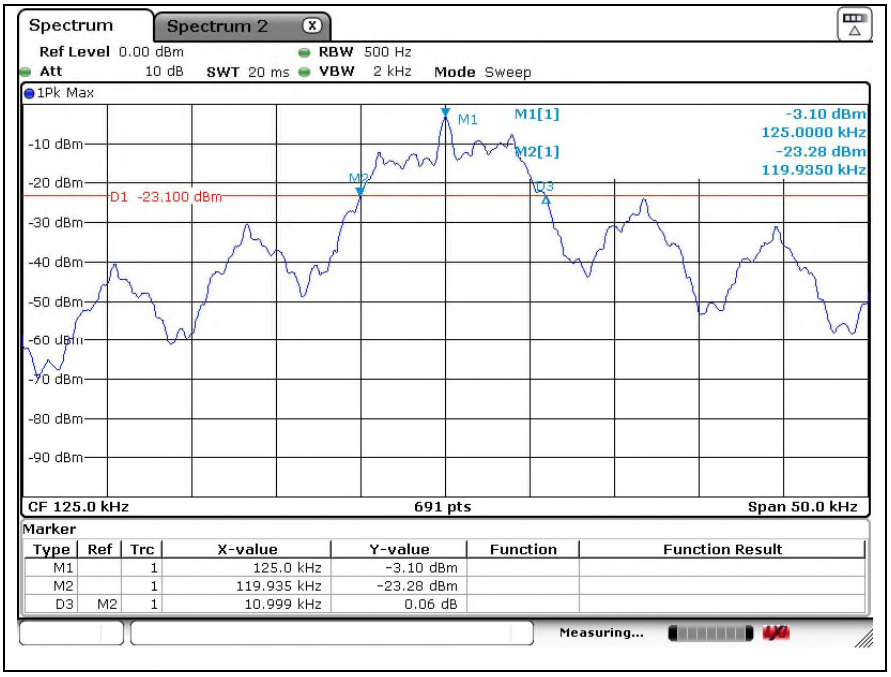
- AST Antenna



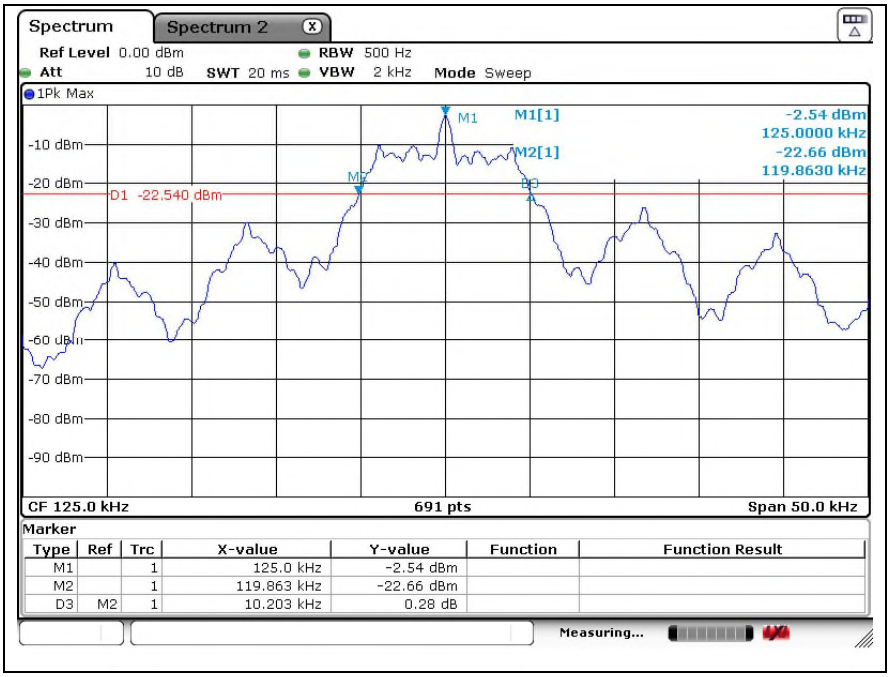
- INT1 Antenna



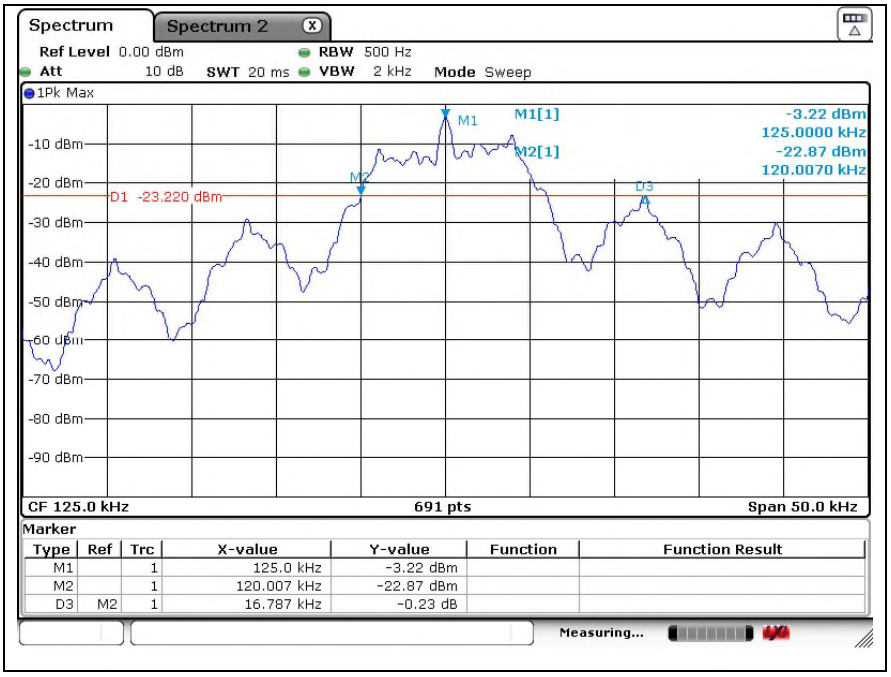
- INT2 Antenna



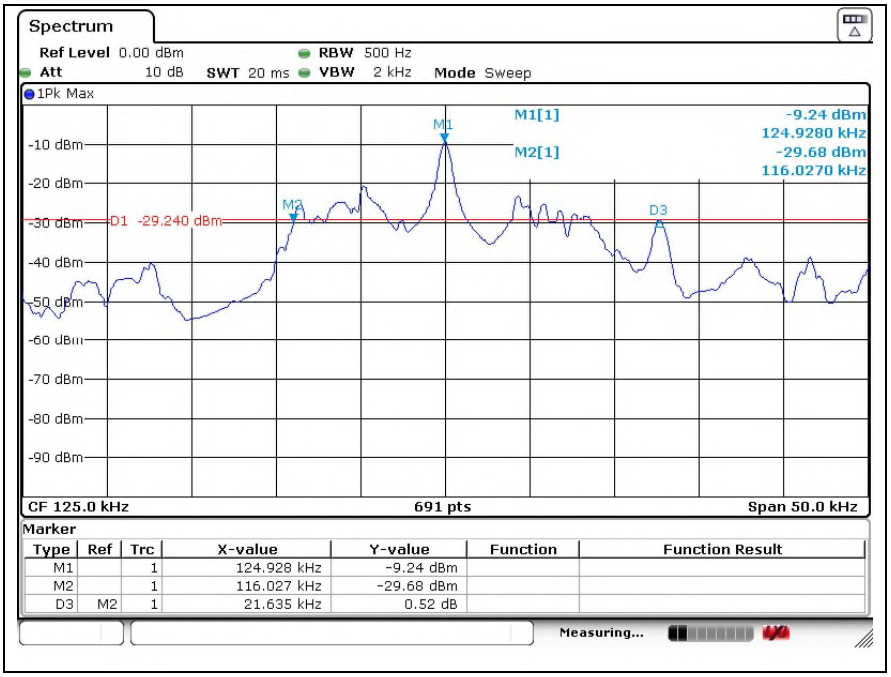
- TRK Antenna



- BMP Antenna

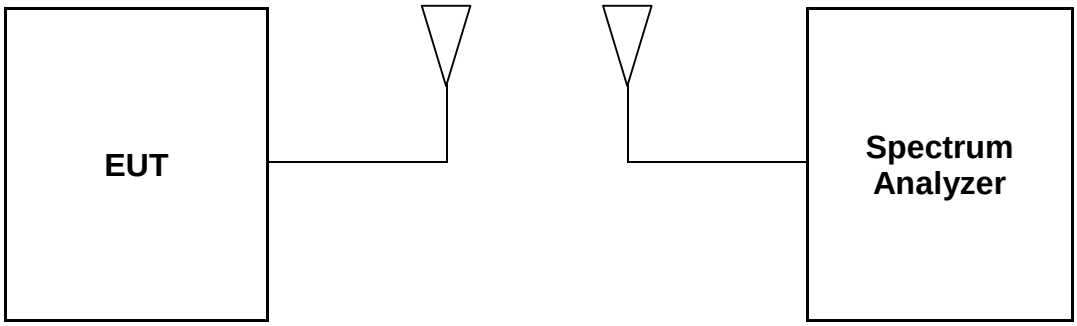


- SSB Antenna



4. Occupied Bandwidth

4.1. Test Setup



4.2. Limit

None; for reporting purposed only

4.3. Test Procedure

1. Set the spectrum analyzer as SPAN = shall be between 1.5 times and 5.0 times the OBW, RBW = 1% to 5% of the OBW, VBW = set approximately 3 x RBW, Detector = peak, Trace mode = max hold.
2. Measure lowest and highest frequencies are placed in a running sum until 0.5 % and 99.5 % of the total is reached.
3. Record the SPAN between the lowest and the highest frequencies for the 99 % occupied bandwidth.

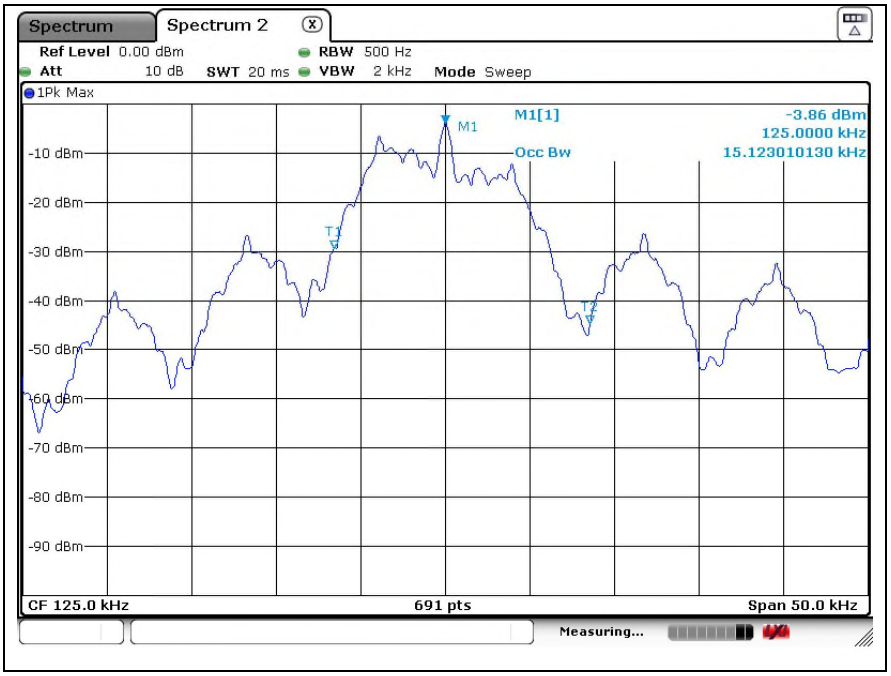
4.4. Test Result

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

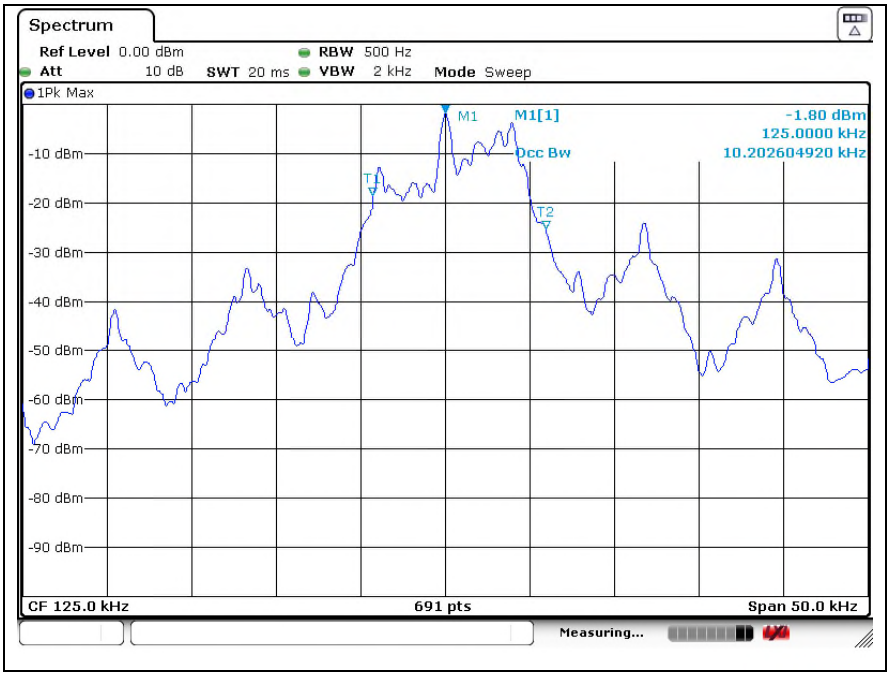
Test Antenna	Frequency (㎒)	Occupied Bandwidth (㎑)	Limit
DRV Antenna	125	15.123	Reporting proposed only
AST Antenna	125	10.203	
INT1 Antenna	125	16.715	
INT2 Antenna	125	16.425	
TRK Antenna	125	14.834	
BMP Antenna	125	17.004	
SSB Antenna	125	21.852	

- Test plots

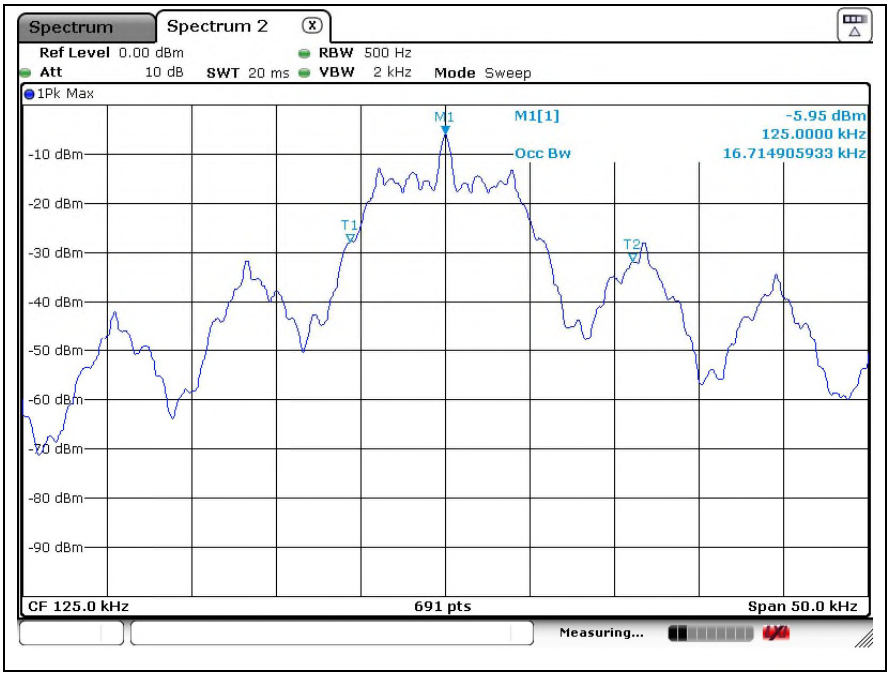
- DRV Antenna



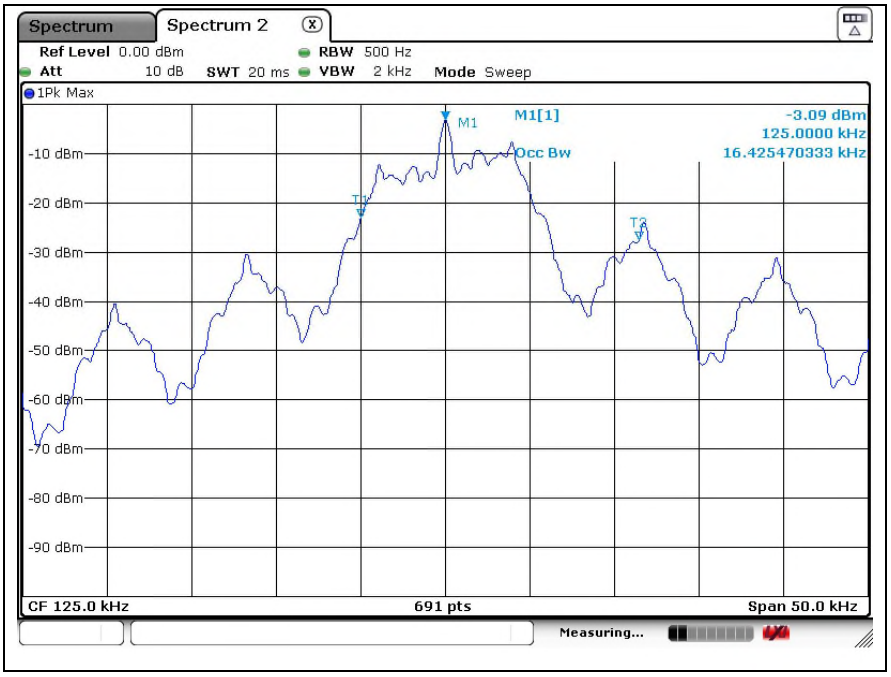
- AST Antenna



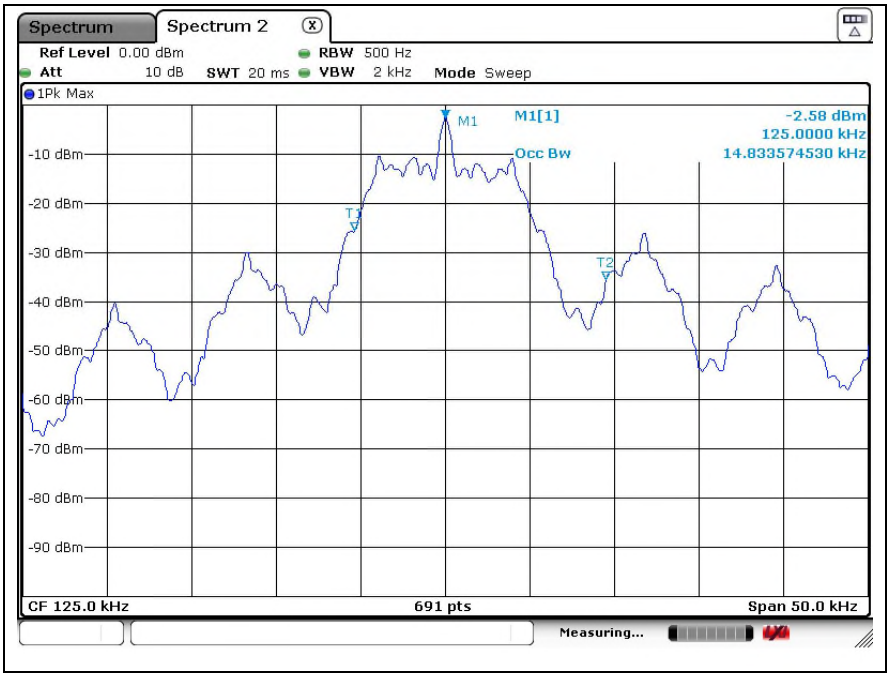
- INT1 Antenna



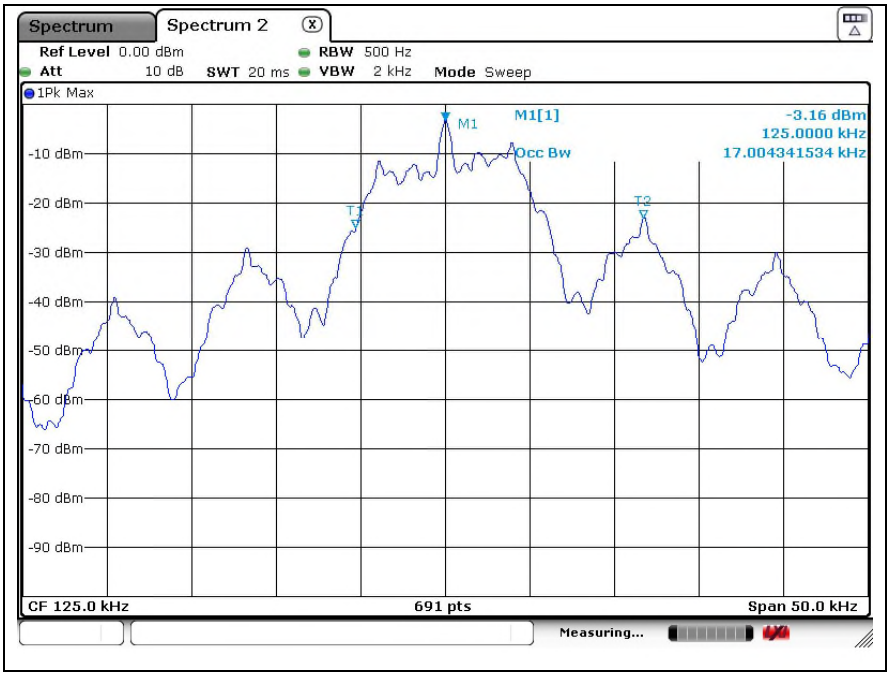
- INT2 Antenna



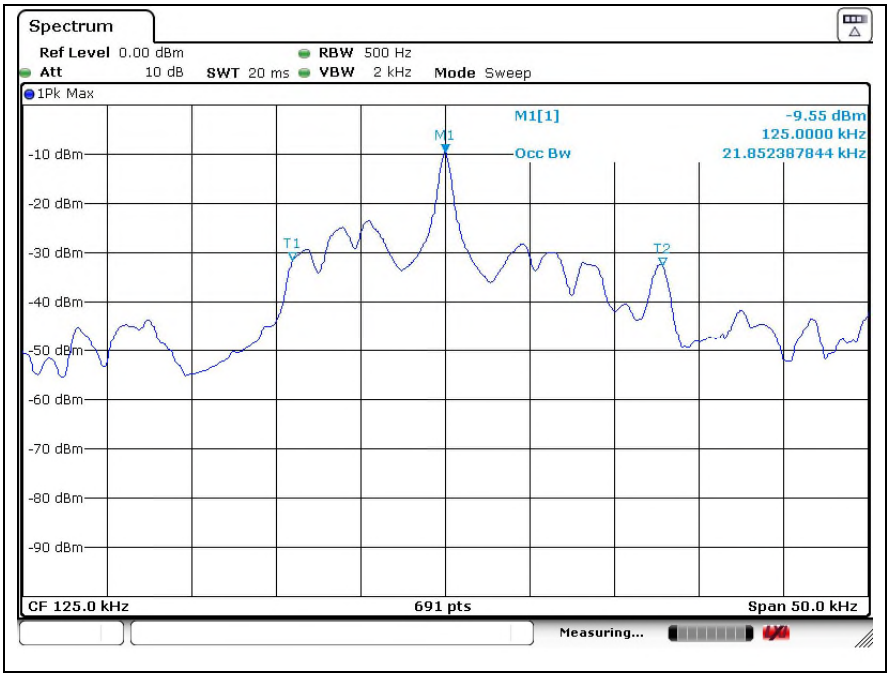
- TRK Antenna



- BMP Antenna



- SSB Antenna



- End of the Test Report -