



Impact of charging current quantity in DC charging mode on RE and CE

JSAE

Contents

1. Radiated emissions $\geq 30\text{MHz}$

DUT : Prototype EV 1

Measurement site: ALSE 1

2. Radiated emissions $\geq 30\text{MHz}$

DUT : Prototype EV 2

Measurement site: ALSE 2

3. Conducted emissions $\leq 30\text{MHz}$

DUT : Prototype EV 1

Measurement site: ALSE 1

4. Conducted emissions $\leq 30\text{MHz}$

DUT : Prototype EV 2

Measurement site: ALSE 2

Contents

1. Radiated emissions $\geq 30\text{MHz}$

DUT : Prototype EV 1

Measurement site: ALSE 1

2. Radiated emissions $\geq 30\text{MHz}$

DUT : Prototype EV 2

Measurement site: ALSE 2

3. Conducted emissions $\leq 30\text{MHz}$

DUT : Prototype EV 1

Measurement site: ALSE 1

4. Conducted emissions $\leq 30\text{MHz}$

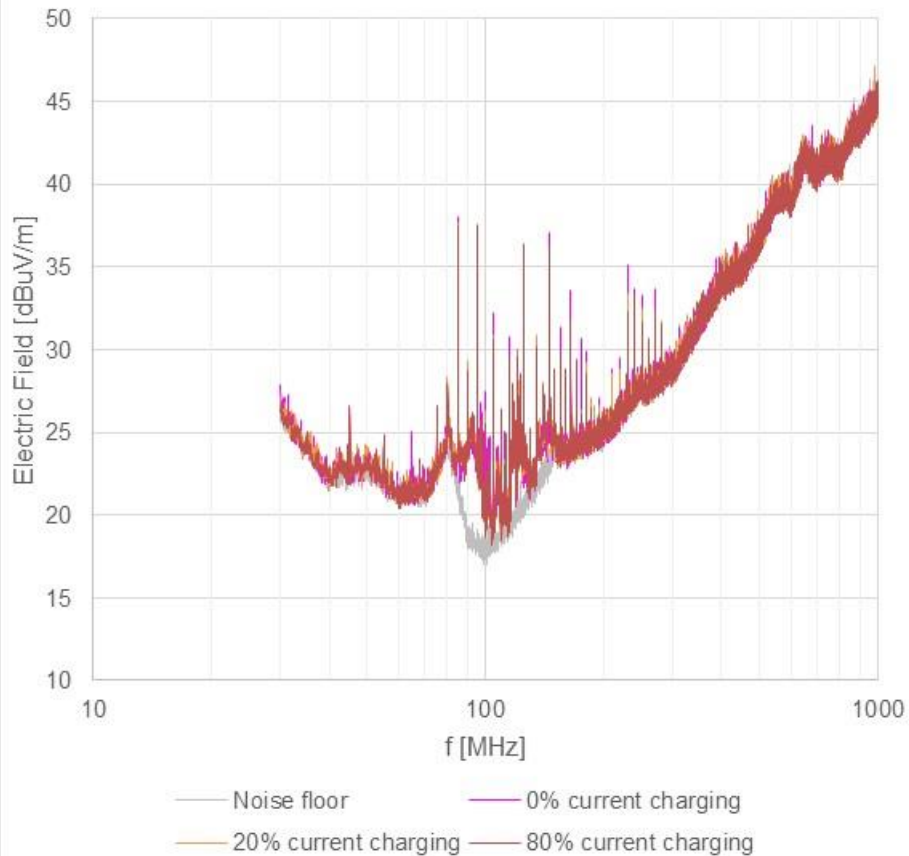
DUT : Prototype EV 2

Measurement site: ALSE 2

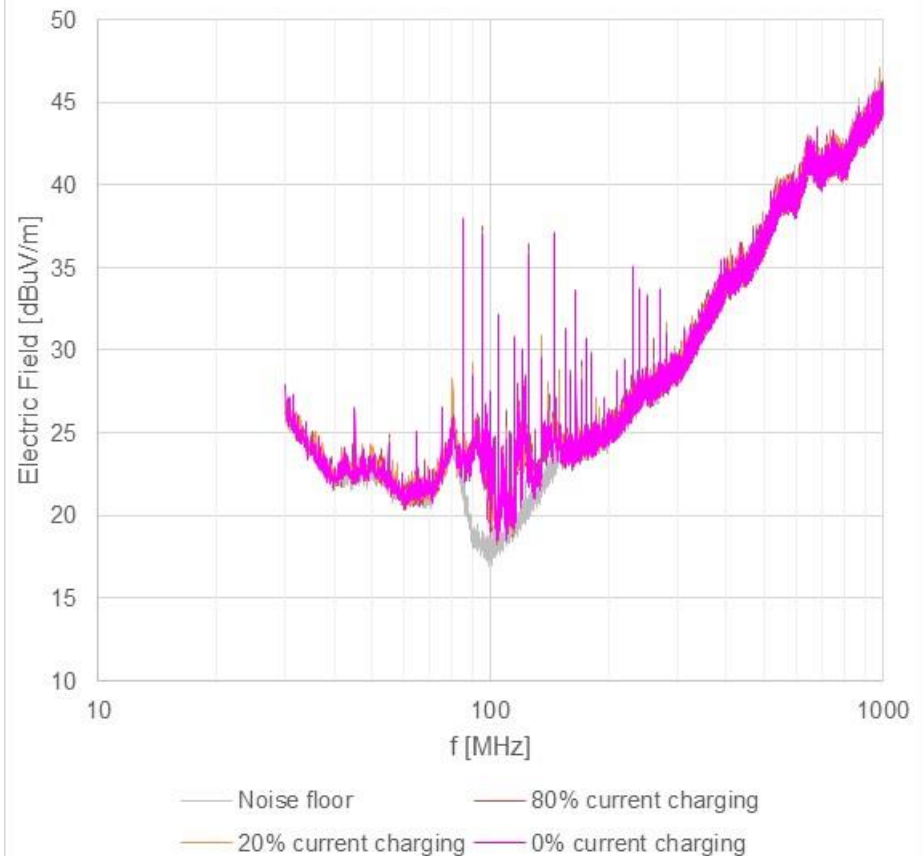
Radiated emissions

DUT : Prototype EV 1
DC charger : CHAdeMO type
Test setup : R10
SOC : <30%
Charging current : 0%, 20% and 80%
Antenna position : Right side at 10m, vertical polarization
Measuring system: FFT based
Detector : Peak
Dwell time : 2 s/sub-band (30-250/250-500/500-750/750-1000MHz)

Peak (Vertical)



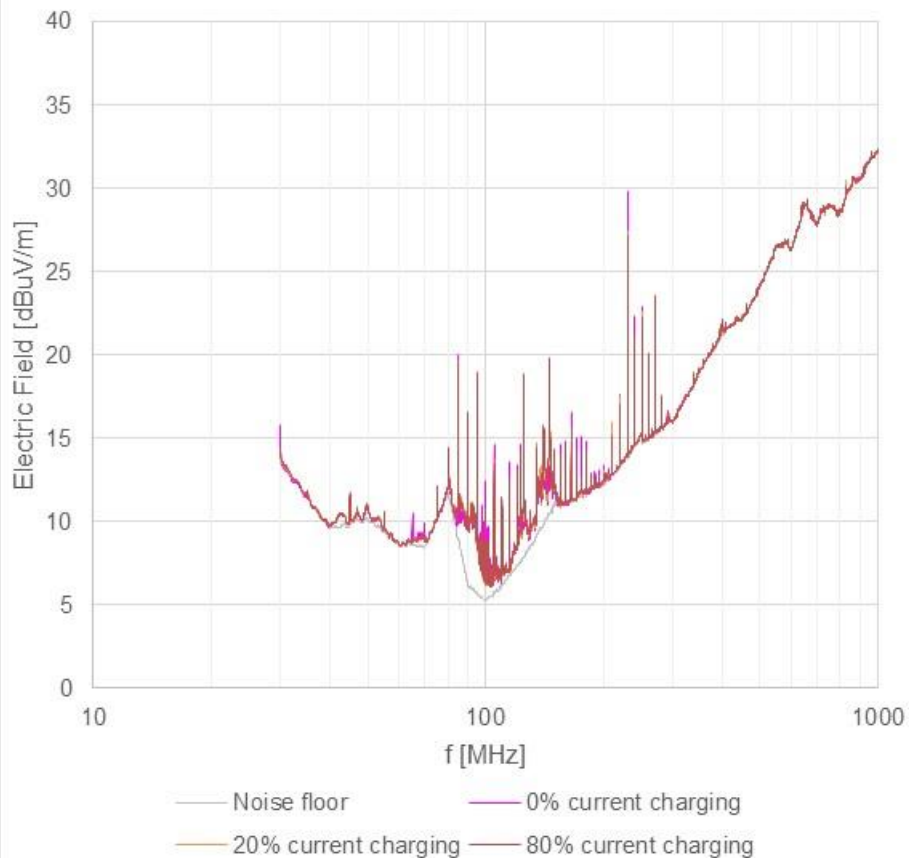
Peak (Vertical)



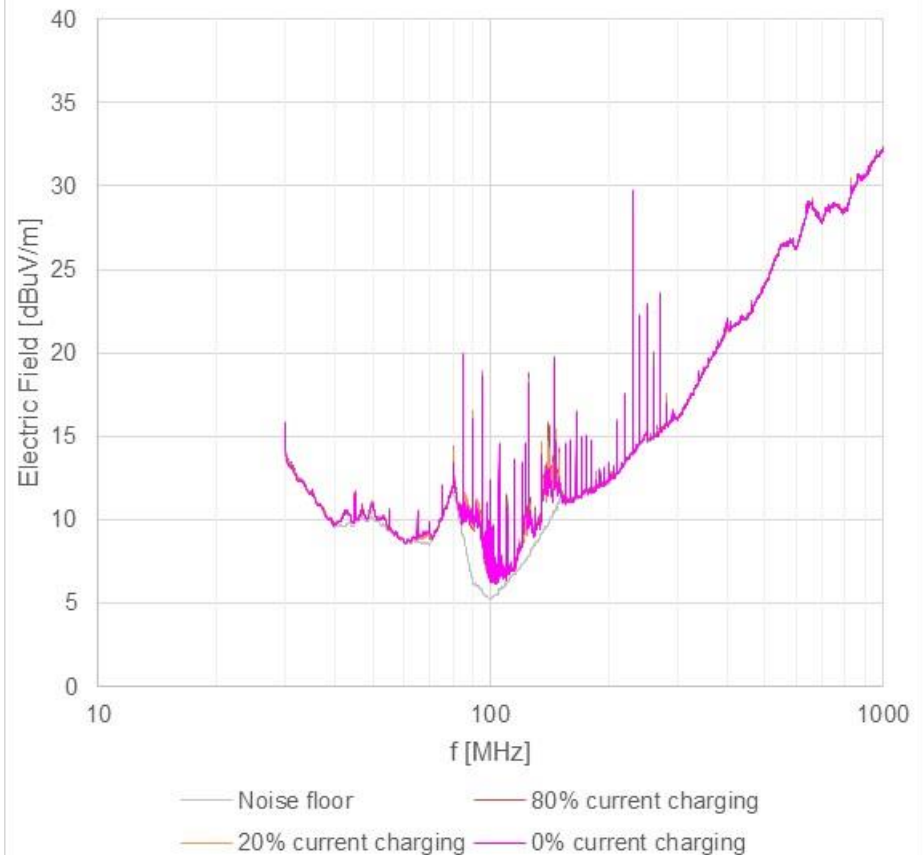
Radiated emissions

DUT : Prototype EV 1
DC charger : CHAdeMO type
Test setup : R10
SOC : <30%
Charging current : 0%, 20% and 80%
Antenna position : Right side at 10m, vertical polarization
Measuring system: FFT based
Detector : Average
Dwell time : 2 s/sub-band (30-250/250-500/500-750/750-1000MHz)

Ave (Vertical)



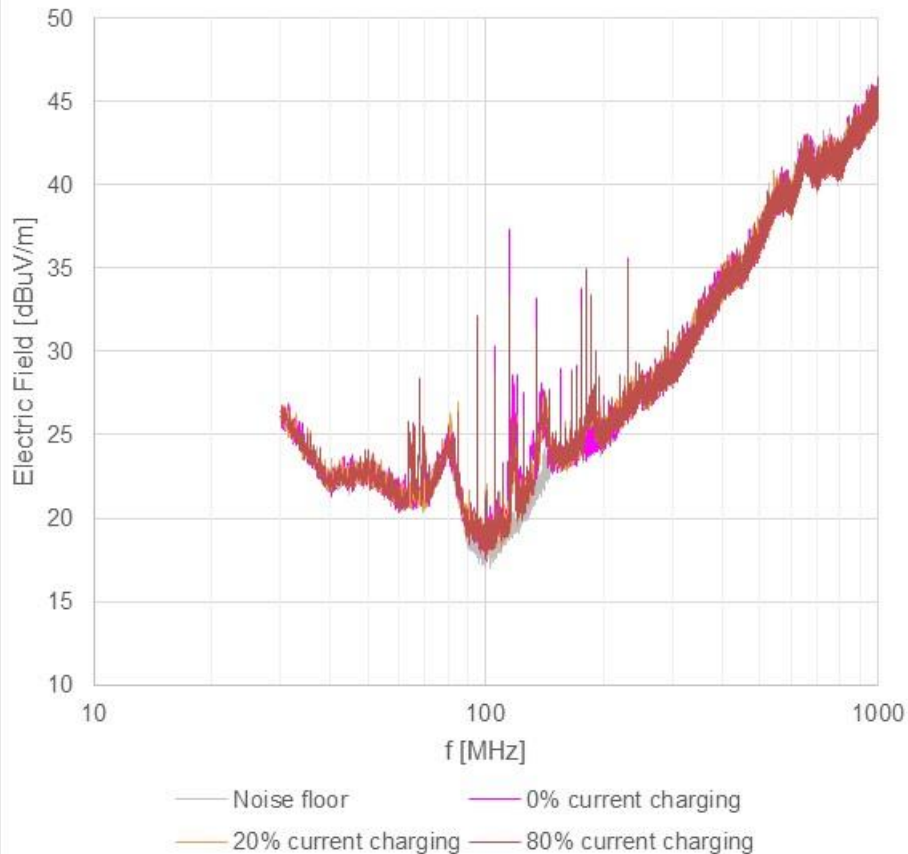
Ave (Vertical)



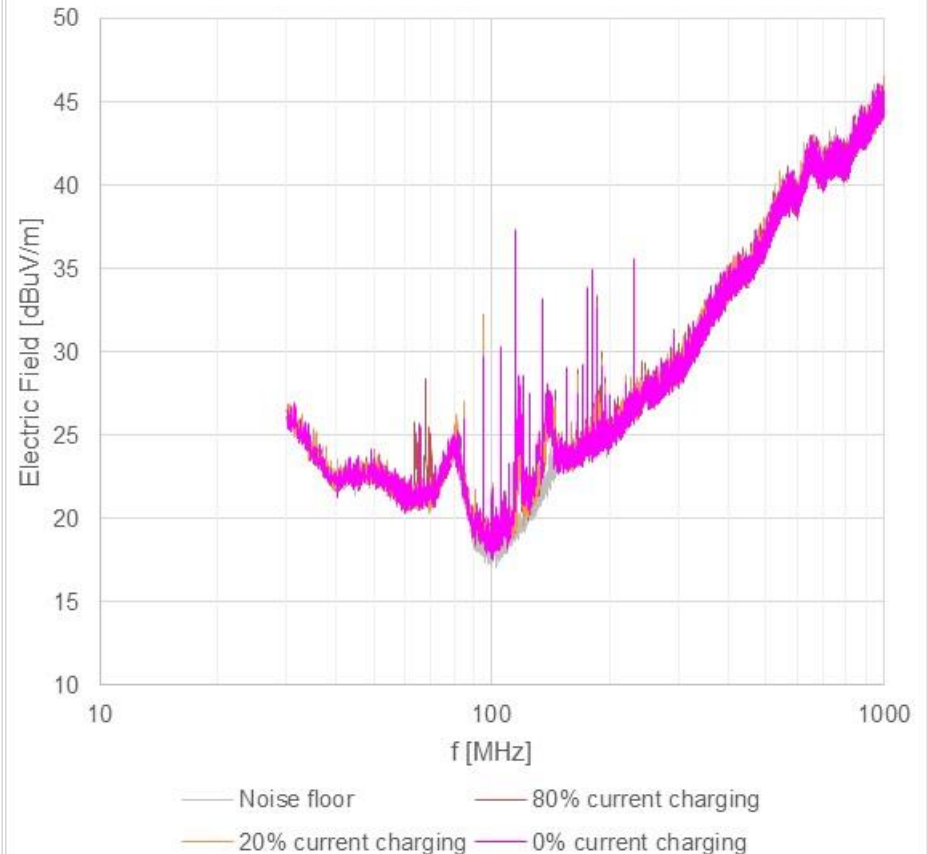
Radiated emissions

DUT : Prototype EV 1
DC charger : CHAdeMO type
Test setup : R10
SOC : <30%
Charging current : 0%, 20% and 80%
Antenna position : Right side at 10m, Horizontal polarization
Measuring system: FFT based
Detector : Peak
Dwell time : 2 s/sub-band (30-250/250-500/500-750/750-1000MHz)

Peak (Horizontal)



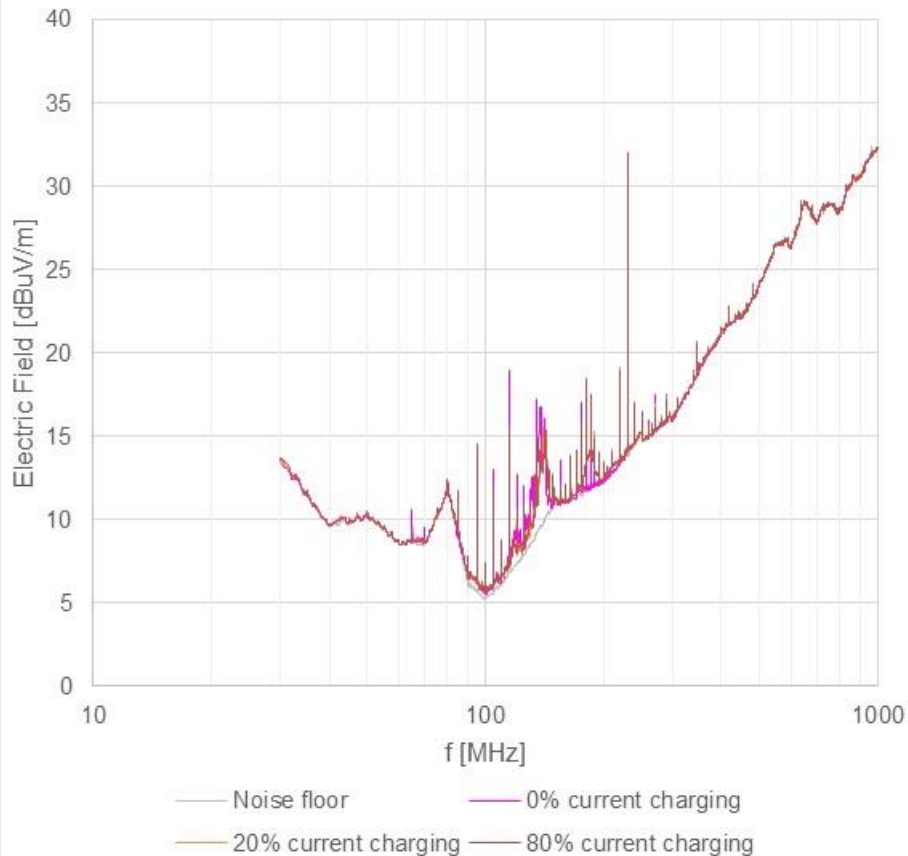
Peak (Horizontal)



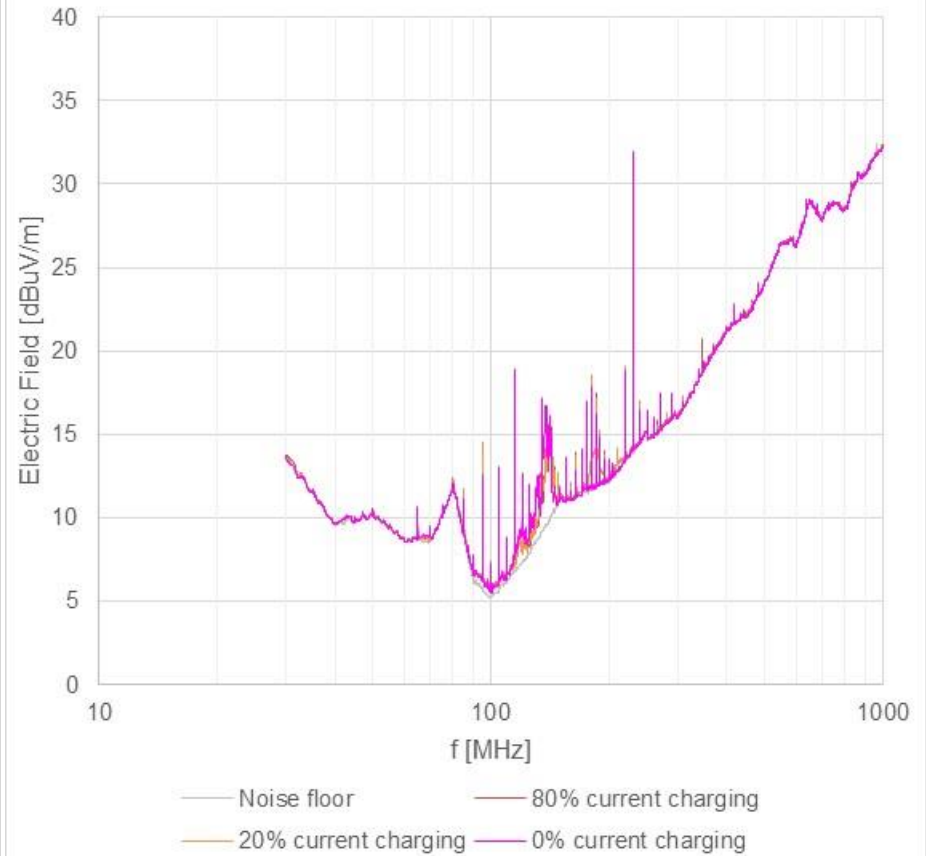
Radiated emissions

DUT : Prototype EV 1
DC charger : CHAdeMO type
Test setup : R10
SOC : <30%
Charging current : 0%, 20% and 80%
Antenna position : Right side at 10m, Horizontal polarization
Measuring system: FFT based
Detector : Average
Dwell time : 2 s/sub-band (30-250/250-500/500-750/750-1000MHz)

Ave (Horizontal)



Ave (Horizontal)



Contents

1. Radiated emissions $\geq 30\text{MHz}$

DUT : Prototype EV 1

Measurement site: ALSE 1

2. Radiated emissions $\geq 30\text{MHz}$

DUT : Prototype EV 2

Measurement site: ALSE 2

3. Conducted emissions $\leq 30\text{MHz}$

DUT : Prototype EV 1

Measurement site: ALSE 1

4. Conducted emissions $\leq 30\text{MHz}$

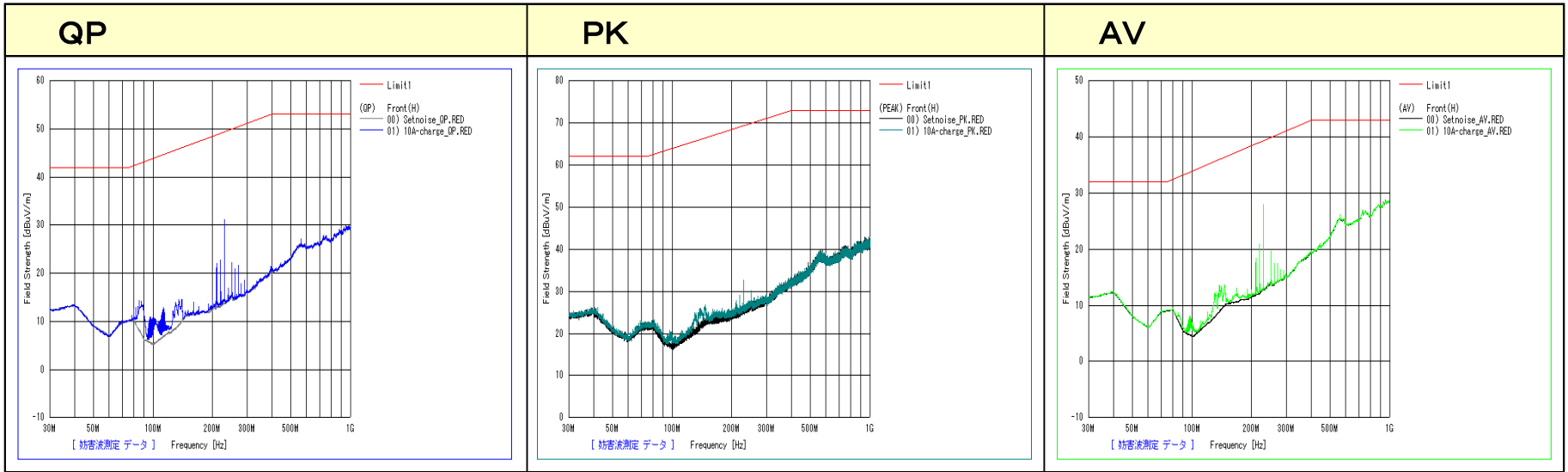
DUT : Prototype EV 2

Measurement site: ALSE 2

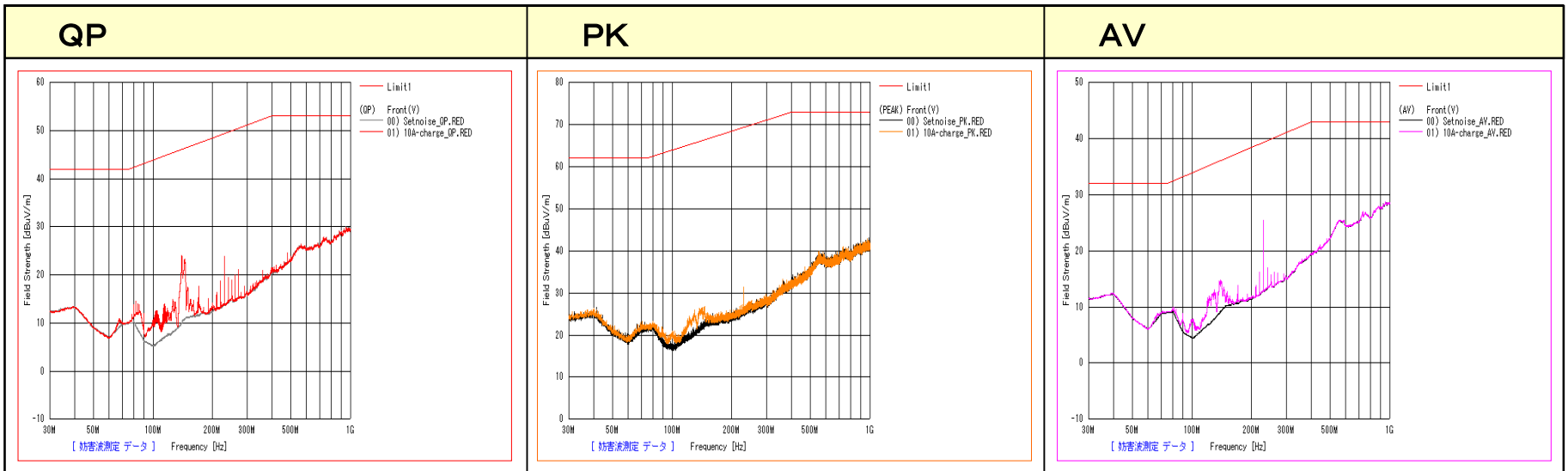
Radiated emissions at 10A

DC charger : Prototype CHAdEMO
 Antenna position : 3m in front of DUT (to see difference clearly)
 SOC : 20-30%
 Charging current : 10A, 25A, 50A, 100A, 150A, 200A, 250A
 Measuring system: Dwell FFT based
 time & scan : 1 s/sub-band, maxhold with 3 scans

(1) Horizontal Polarization



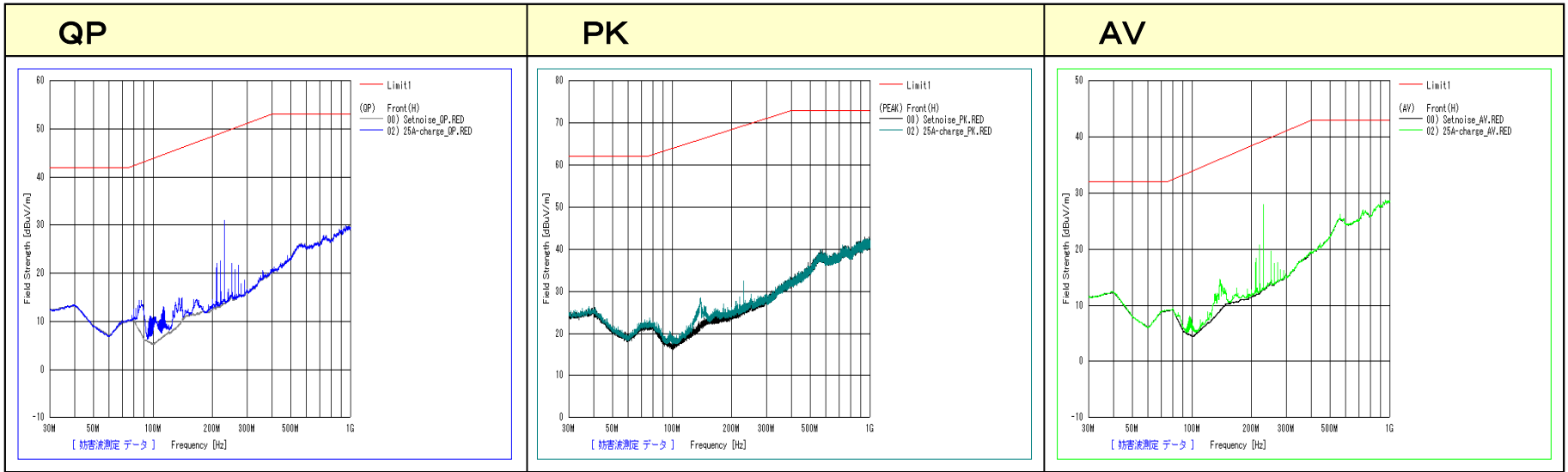
(2) Vertical Polarization



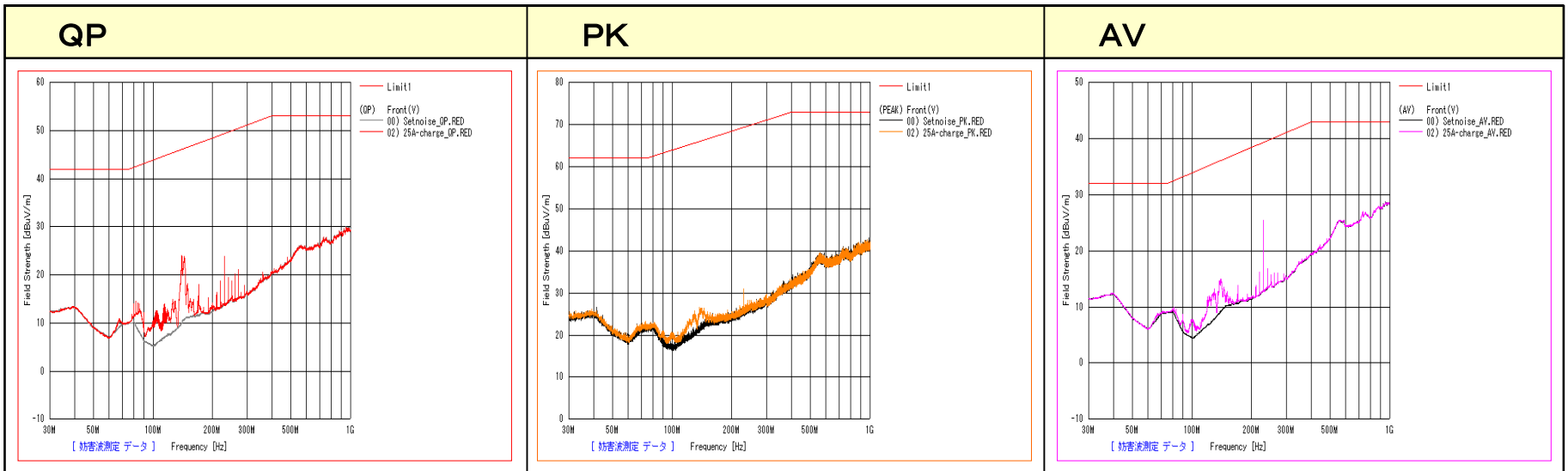
Radiated emissions at 25A

DC charger : Prototype CHAdEMO
 Antenna position : 3m in front of DUT (to see difference clearly)
 SOC : 20-30%
 Charging current : 10A, 25A, 50A, 100A, 150A, 200A, 250A
 Measuring system: Dwell FFT based
 time & scan : 1 s/sub-band, maxhold with 3 scans

(1) Horizontal Polarization



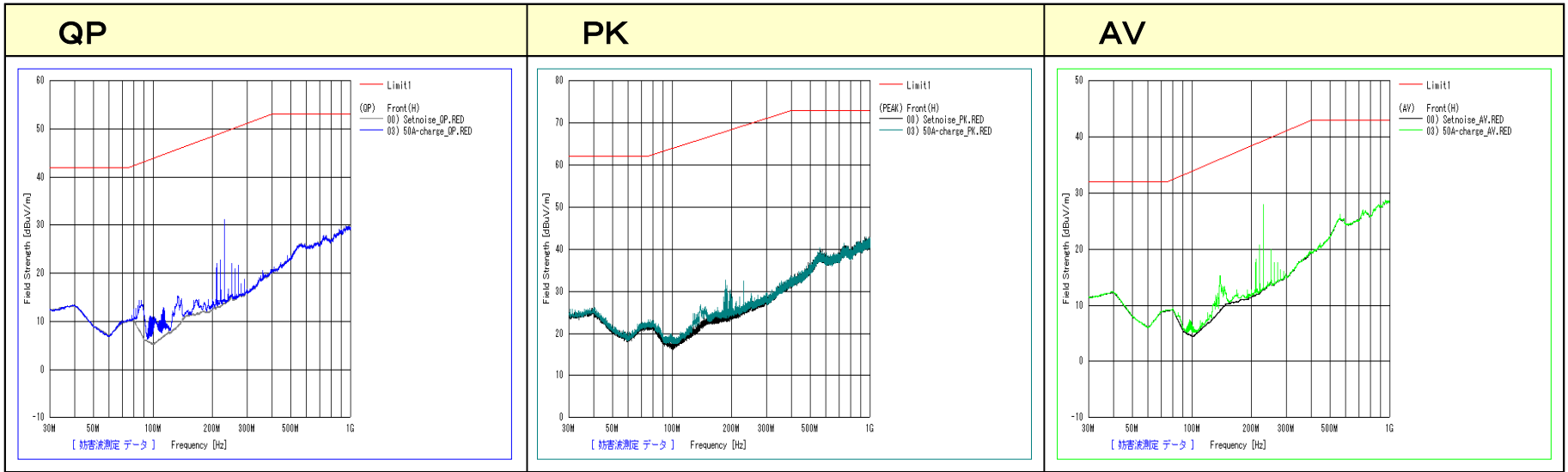
(2) Vertical Polarization



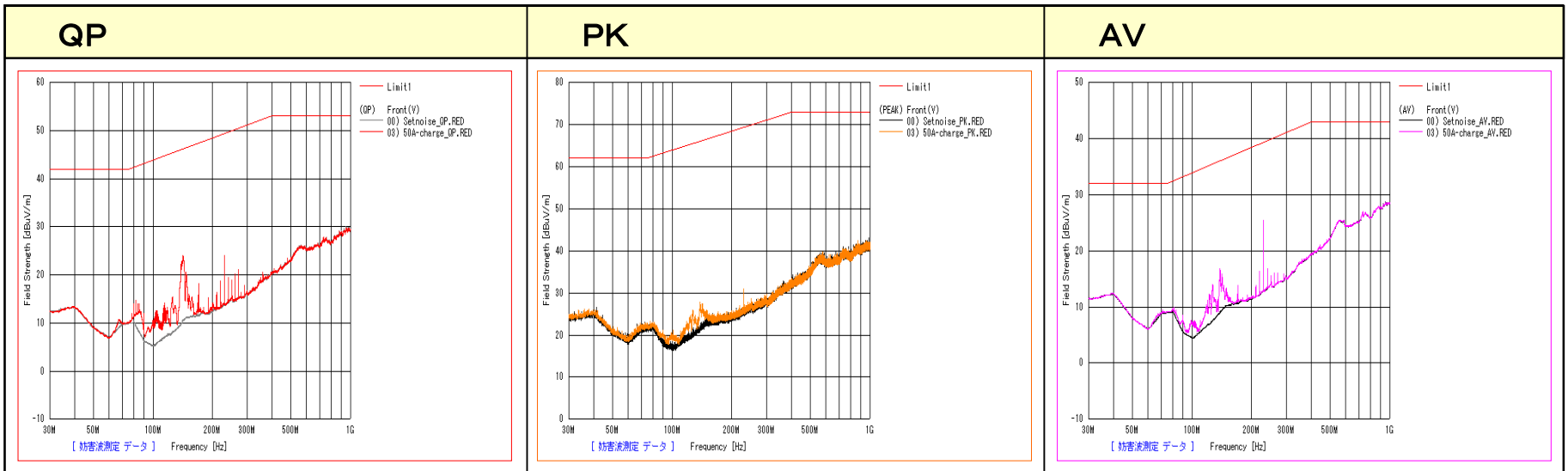
Radiated emissions at 50A

DC charger : Prototype CHAdEMO
 Antenna position : 3m in front of DUT (to see difference clearly)
 SOC : 20-30%
 Charging current : 10A, 25A, 50A, 100A, 150A, 200A, 250A
 Measuring system: Dwell FFT based
 time & scan : 1 s/sub-band, maxhold with 3 scans

(1) Horizontal Polarization



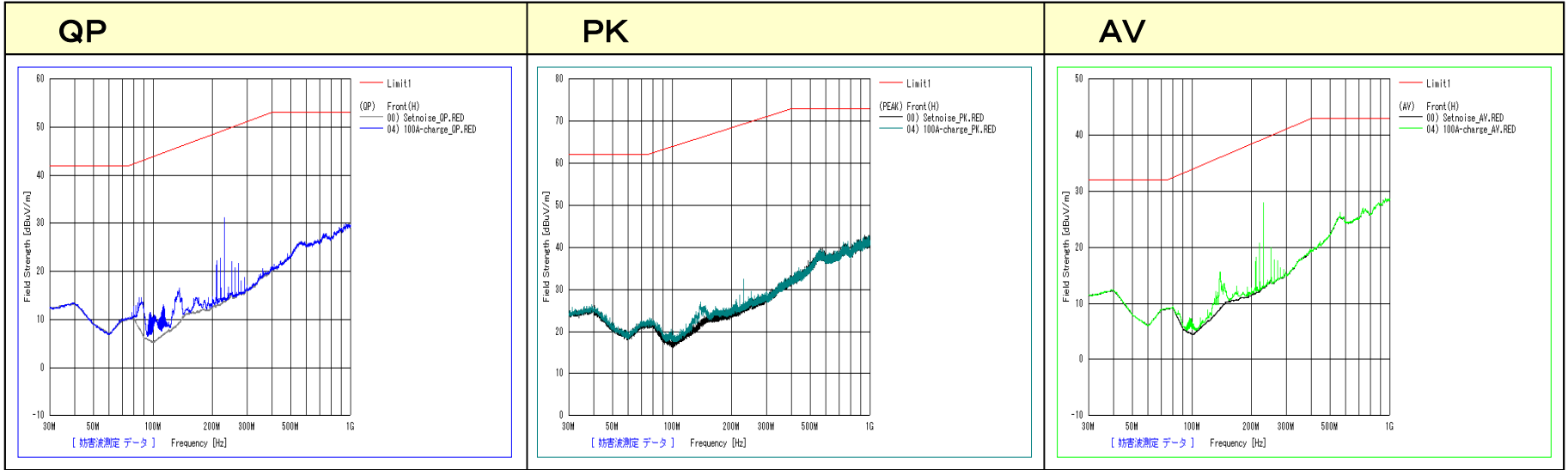
(2) Vertical Polarization



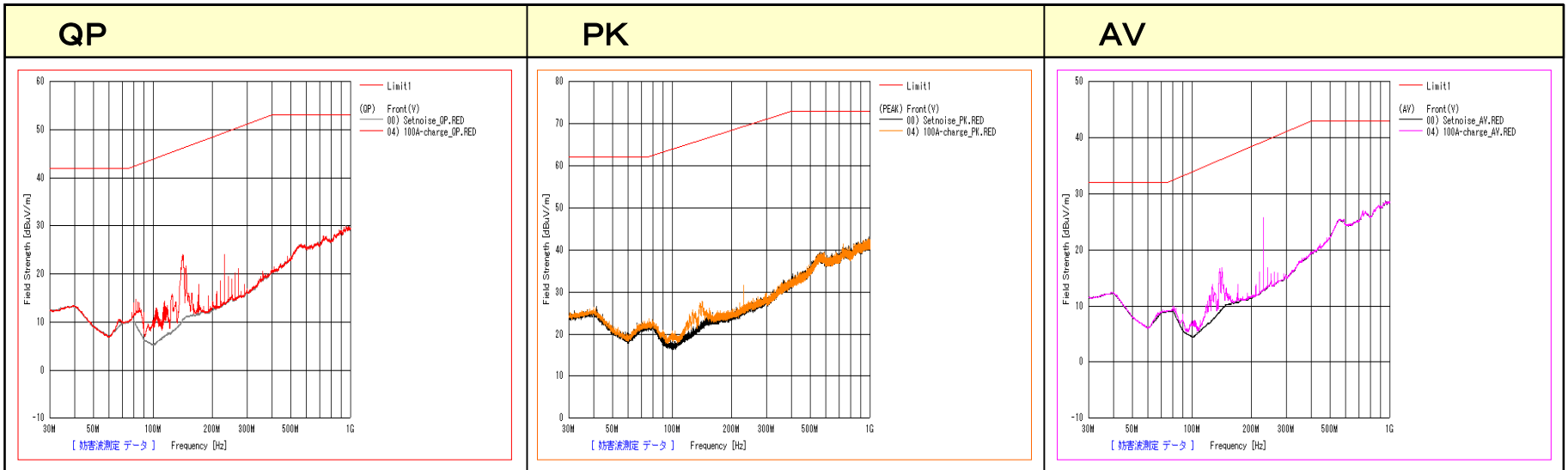
Radiated emissions at 100A

DC charger : Prototype CHAdEMO
 Antenna position : 3m in front of DUT (to see difference clearly)
 SOC : 20-30%
 Charging current : 10A, 25A, 50A, 100A, 150A, 200A, 250A
 Measuring system: Dwell FFT based
 time & scan : 1 s/sub-band, maxhold with 3 scans

(1) Horizontal Polarization



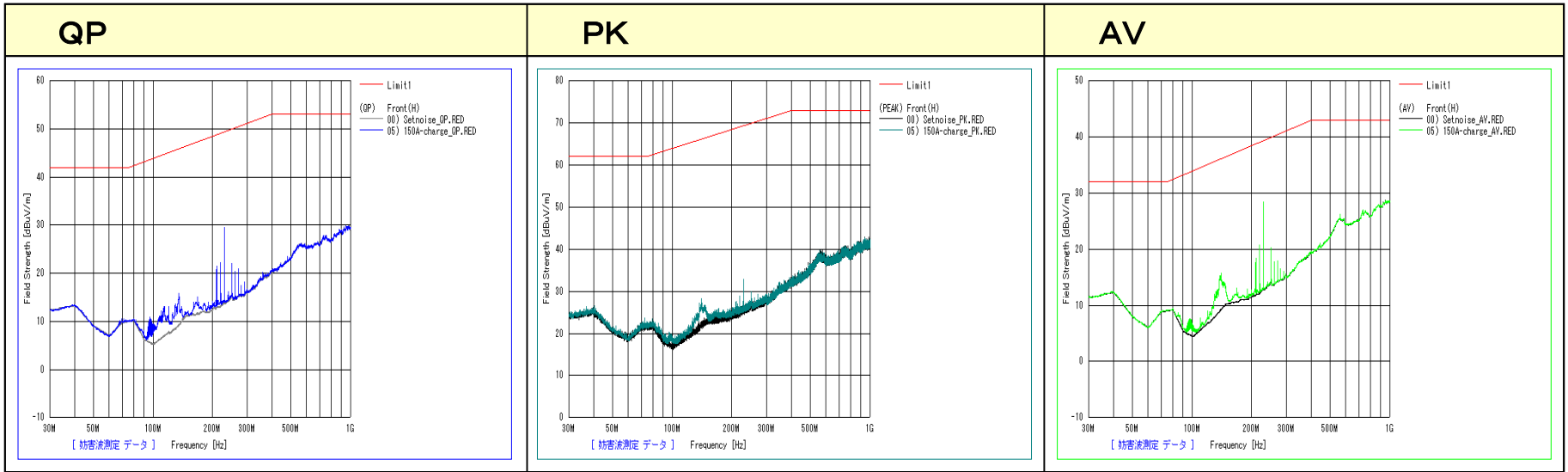
(2) Vertical Polarization



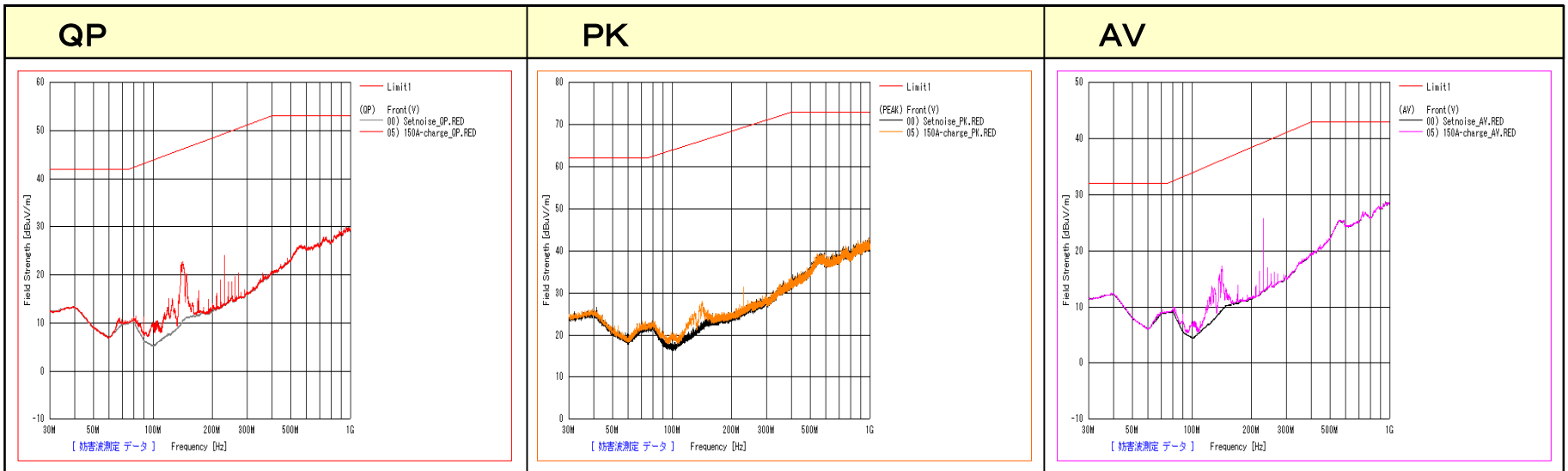
Radiated emissions at 150A

DC charger : Prototype CHAdEMO
 Antenna position : 3m in front of DUT (to see difference clearly)
 SOC : 20-30%
 Charging current : 10A, 25A, 50A, 100A, 150A, 200A, 250A
 Measuring system: Dwell FFT based
 time & scan : 1 s/sub-band, maxhold with 3 scans

(1) Horizontal Polarization



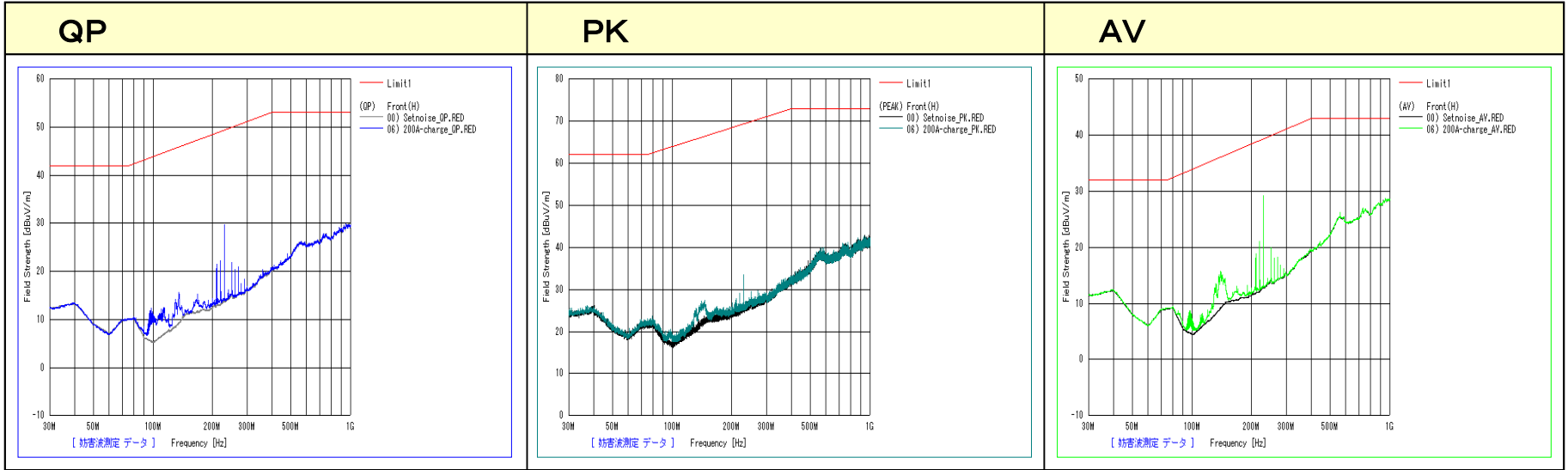
(2) Vertical Polarization



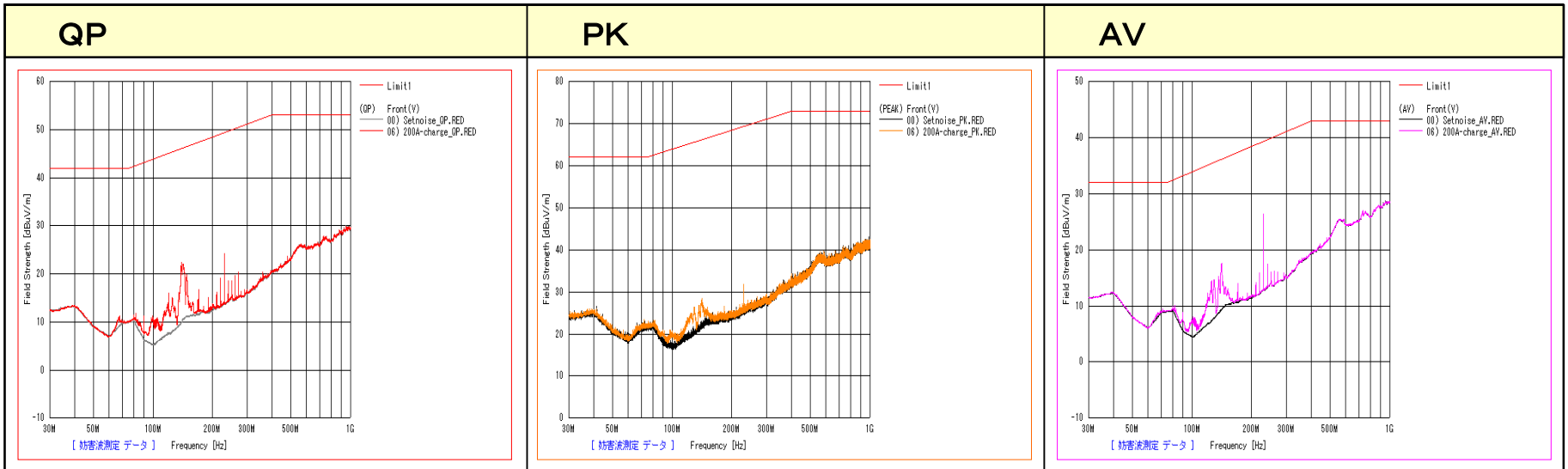
Radiated emissions at 200A

DC charger : Prototype CHAdEMO
 Antenna position : 3m in front of DUT (to see difference clearly)
 SOC : 20-30%
 Charging current : 10A, 25A, 50A, 100A, 150A, 200A, 250A
 Measuring system: Dwell FFT based
 time & scan : 1 s/sub-band, maxhold with 3 scans

(1) Horizontal Polarization



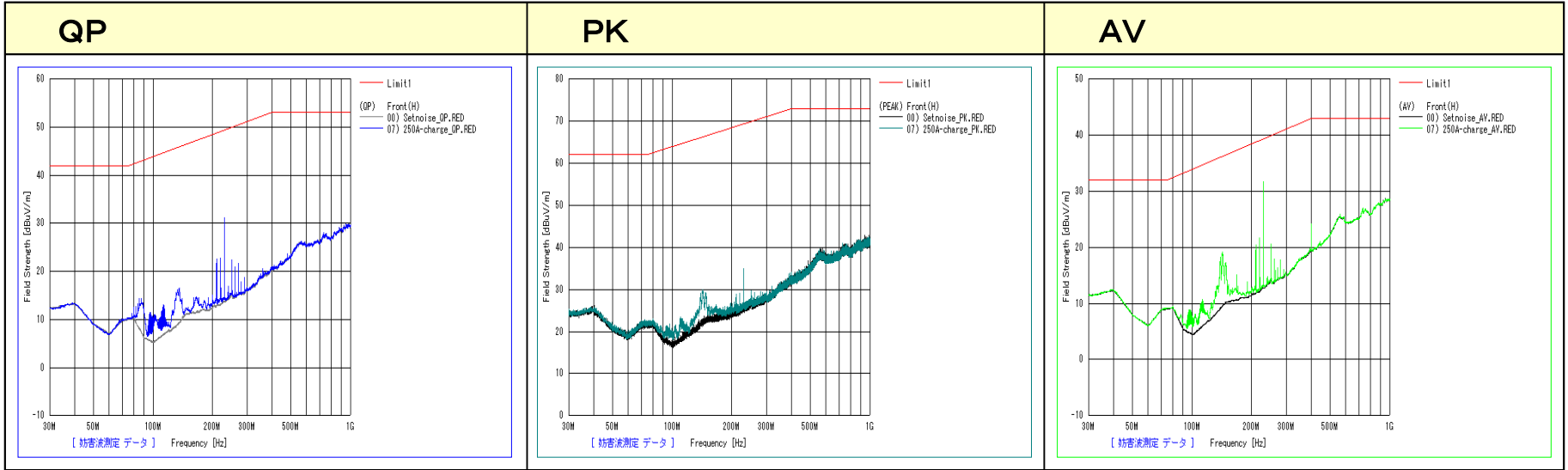
(2) Vertical Polarization



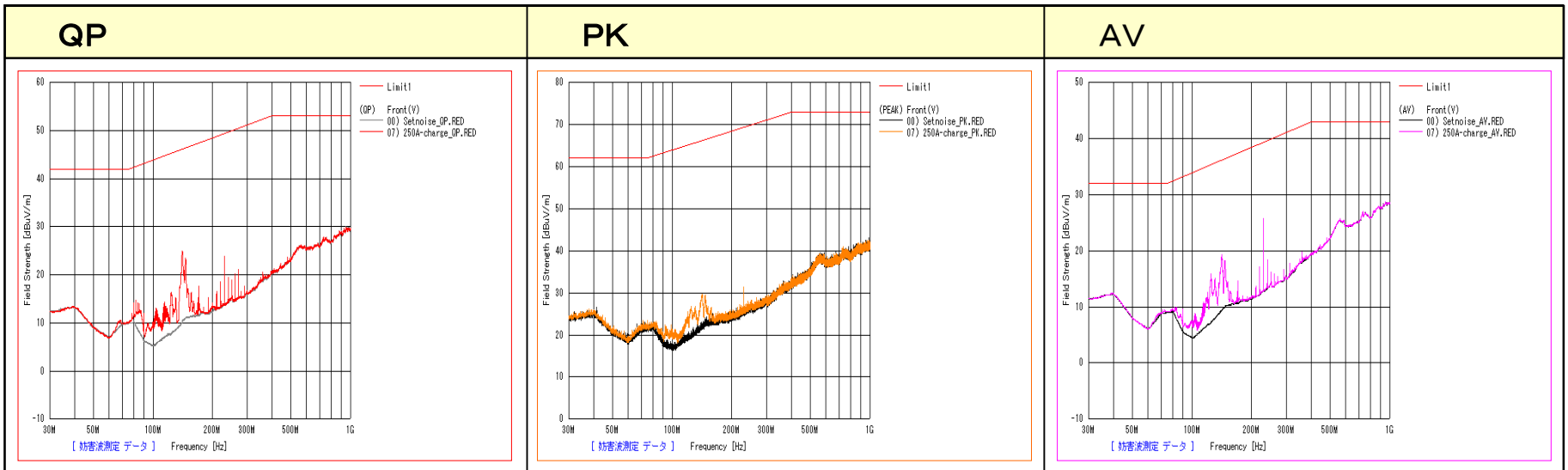
Radiated emissions at 250A

DC charger : Prototype CHAdEMO
 Antenna position : 3m in front of DUT (to see difference clearly)
 SOC : 20-30%
 Charging current : 10A, 25A, 50A, 100A, 150A, 200A, 250A
 Measuring system: Dwell FFT based
 time & scan : 1 s/sub-band, maxhold with 3 scans

(1) Horizontal Polarization



(2) Vertical Polarization



Synthesis table : Radiated emissions Horizontal QP

Freq.		Level (dBµV)							ΔV (dB)			
Sub-band		DC charging current							ΔV = max - min			
No.	(MHz)	10A	25A	50A	100A	150A	200A	250A	Max	Min	ΔV	Max ΔV
1	30-34	12.6	12.6	12.6	12.6	12.6	12.6	12.6	12.6	12.6	0	3.9
2	34-45	13.4	13.4	13.4	13.4	13.5	13.5	13.4	13.5	13.4	0.1	
3	45-60	11.1	11.1	11.2	11.1	11.2	11.1	11.1	11.2	11.1	0.1	
4	60-80	12.5	12.5	12.6	12.6	10.6	10.1	12.6	12.6	10.1	2.5	
5	80-100	14.3	14.3	14.3	14.4	10.5	12.4	14.4	14.4	10.5	3.9	
6	100-130	13.9	14	12.9	14.3	13	14.1	14.3	14.3	12.9	1.4	
7	130-170	14.6	14.9	15.2	16.5	15.8	15.6	16.5	16.5	14.6	1.9	
8	170-225	22.7	22.6	22.7	22.5	22.2	22.2	22.5	22.7	22.2	0.5	
9	225-300	31.1	31	31.1	31.2	29.5	29.6	31.2	31.2	29.5	1.7	
10	300-400	21.7	20.6	20.5	20.6	20.2	20.4	20.6	21.7	20.2	1.5	
11	400-525	24.8	24.8	24.8	24.9	24.8	24.8	24.9	24.9	24.8	0.1	
12	525-700	27.1	26.4	26.4	26.6	26.5	26.5	26.6	27.1	26.4	0.7	
13	700-850	28.2	28.1	28.1	28.2	28.2	28.2	28.2	28.2	28.1	0.1	
14	850-1000	29.8	29.8	29.7	29.9	29.8	29.9	29.9	29.9	29.7	0.2	

Synthesis table : Radiated emissions Vertical QP

Freq.		Level (dB μ V)							Δ V (dB)			
Sub-band		DC charging current							Δ V = max - min			
No.	(MHz)	10A	25A	50A	100A	150A	200A	250A	Max	Min	Δ V	Max Δ V
1	30-34	12.6	12.6	12.6	12.5	12.6	12.7	12.5	12.7	12.5	0.2	3.3
2	34-45	13.5	13.4	13.4	13.4	13.4	13.4	13.4	13.5	13.4	0.1	
3	45-60	11.1	11.1	11.2	11.1	11.1	11.2	11.1	11.2	11.1	0.1	
4	60-80	13.8	13.9	13.9	14.1	11.1	11.3	14.1	14.1	11.1	3	
5	80-100	14.6	14.6	14.7	14.7	11.4	11.7	14.7	14.7	11.4	3.3	
6	100-130	14.9	14.9	15.4	16.3	15.1	15.9	16.3	16.3	14.9	1.4	
7	130-170	24.1	24.1	24	24.9	22.7	22.3	24.9	24.9	22.3	2.6	
8	170-225	17.7	18	18.2	17.6	19	19.1	17.6	19.1	17.6	1.5	
9	225-300	23.9	23.9	24	23.9	24.1	24.2	23.9	24.2	23.9	0.3	
10	300-400	20.9	20.6	20.5	20.6	20.3	20.3	20.6	20.9	20.3	0.6	
11	400-525	24.8	24.7	24.7	24.9	24.8	24.9	24.9	24.9	24.7	0.2	
12	525-700	26.5	26.5	26.5	26.6	26.5	26.5	26.6	26.6	26.5	0.1	
13	700-850	28.2	28.1	28.1	28.2	28.2	28.2	28.2	28.2	28.1	0.1	
14	850-1000	29.8	29.8	29.7	29.9	29.8	29.8	29.9	29.9	29.7	0.2	

Synthesis table : Radiated emissions Horizontal PK

Freq.		Level (dB μ V)							Δ V (dB)			
Sub-band		DC charging current							Δ V = max - min			
No.	(MHz)	10A	25A	50A	100A	150A	200A	250A	Max	Min	Δ V	Max Δ V
1	30–34	25.4	25.5	25.8	25.7	25.4	25.5	25.4	25.8	25.4	0.4	4.1
2	34–45	26.2	26.4	26.1	26.4	26.5	26.1	25.7	26.5	25.7	0.8	
3	45–60	23.4	23.4	23.7	24.1	23.5	23.7	23.3	24.1	23.3	0.8	
4	60–80	23.1	23.6	23.3	23.2	23.6	23.6	22.9	23.6	22.9	0.7	
5	80–100	23.2	22.9	23.0	22.7	22.8	22.9	22.7	23.2	22.7	0.5	
6	100–130	24.2	23.5	24.6	23.8	24.0	25.0	23.4	25.0	23.4	1.6	
7	130–170	26.7	28.5	26.8	27.0	28.3	27.5	30.0	30.0	26.7	3.3	
8	170–225	29.1	28.7	32.7	28.6	28.9	29.0	28.8	32.7	28.6	4.1	
9	225–300	32.7	32.5	32.5	32.4	32.9	33.4	35.0	35.0	32.4	2.6	
10	300–400	33.0	33.4	33.7	33.2	33.3	33.3	34.0	34.0	33.0	1.0	
11	400–525	37.4	37.9	37.5	37.3	37.3	37.1	37.2	37.9	37.1	0.8	
12	525–700	39.6	40.0	40.4	39.4	39.7	40.0	39.5	40.4	39.4	1.0	
13	700–850	41.4	40.9	41.4	41.4	41.1	41.2	41.0	41.4	40.9	0.5	
14	850–1000	42.8	42.5	42.9	42.6	42.7	42.6	42.4	42.9	42.4	0.5	

Synthesis table : Radiated emissions Vertical PK

Freq.		Level (dB μ V)							Δ V (dB)			
Sub-band		DC charging current							Δ V = max - min			
No.	(MHz)	10A	25A	50A	100A	150A	200A	250A	Max	Min	Δ V	Max Δ V
1	30-34	25.6	25.8	26.0	25.2	25.4	25.3	25.4	26.0	25.2	0.8	3.5
2	34-45	26.4	26.2	26.1	26.4	26.2	26.0	26.2	26.4	26.0	0.4	
3	45-60	23.4	23.6	23.7	23.6	23.7	23.5	24.0	24.0	23.4	0.6	
4	60-80	23.3	23.3	23.2	23.7	23.3	23.5	23.4	23.7	23.2	0.5	
5	80-100	22.8	23.1	23.0	23.0	23.3	23.2	23.1	23.3	22.8	0.5	
6	100-130	25.9	25.8	25.9	25.7	25.6	26.4	26.8	26.8	25.6	1.2	
7	130-170	26.3	26.6	27.8	27.8	28.0	28.4	29.8	29.8	26.3	3.5	
8	170-225	25.5	27.0	25.6	27.4	27.1	26.5	27.2	27.4	25.5	1.9	
9	225-300	31.3	31.0	31.0	31.5	31.3	31.7	31.4	31.7	31.0	0.7	
10	300-400	33.2	33.2	33.3	33.1	33.3	33.7	33.2	33.7	33.1	0.6	
11	400-525	37.5	37.4	37.5	37.5	37.4	37.3	37.5	37.5	37.3	0.2	
12	525-700	39.9	39.5	39.7	39.4	39.5	39.8	39.4	39.9	39.4	0.5	
13	700-850	41.1	41.2	41.4	41.4	41.4	41.5	40.9	41.5	40.9	0.6	
14	850-1000	42.8	42.7	42.4	42.6	42.9	42.5	42.5	42.9	42.4	0.5	

Synthesis table : Radiated emissions **Horizontal AV**

Freq.		Level (dB μ V)							Δ V (dB)			
Sub-band		DC charging current							Δ V = max - min			
No.	(MHz)	10A	25A	50A	100A	150A	200A	250A	Max	Min	Δ V	Max Δ V
1	30-34	11.7	11.6	11.7	11.7	11.7	11.7	11.7	11.7	11.6	0.1	5.6
2	34-45	12.4	12.4	12.4	12.4	12.4	12.4	12.5	12.5	12.4	0.1	
3	45-60	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1	0.0	
4	60-80	9.1	9.2	9.1	9.1	9.1	9.1	9.1	9.2	9.1	0.1	
5	80-100	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	0.0	
6	100-130	11.8	11.7	10.7	10.7	11.8	12.7	10.7	12.7	10.7	2.0	
7	130-170	13.6	14.6	15.3	15.5	15.7	15.7	19.2	19.2	13.6	5.6	
8	170-225	20.9	20.8	20.7	20.7	20.7	21.1	21.6	21.6	20.7	0.9	
9	225-300	28.0	28.0	27.9	27.9	28.4	29.2	31.7	31.7	27.9	3.8	
10	300-400	19.6	19.6	19.7	19.6	19.6	19.7	24.1	24.1	19.6	4.5	
11	400-525	23.8	23.8	23.8	23.8	23.8	23.8	23.8	23.8	23.8	0.0	
12	525-700	26.2	26.2	26.2	26.2	26.2	26.2	25.9	26.2	25.9	0.3	
13	700-850	27.2	27.2	27.2	27.2	27.2	27.2	27.2	27.2	27.2	0.0	
14	850-1000	28.6	28.7	28.7	28.7	28.6	28.7	28.6	28.7	28.6	0.1	

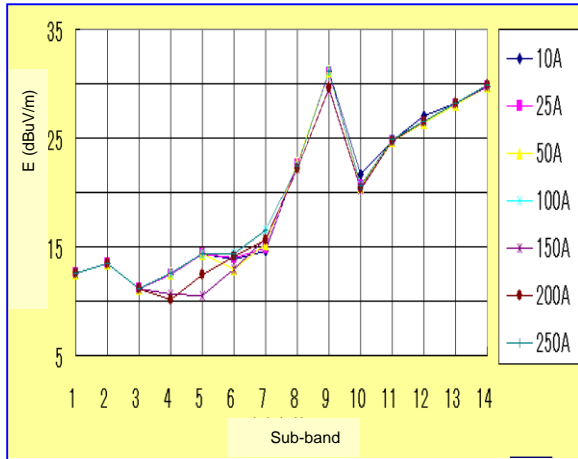
Synthesis table : Radiated emissions Vertical AV

Freq.		Level (dB μ V)							Δ V (dB)			
Sub-band		DC charging current							Δ V = max - min			
No.	(MHz)	10A	25A	50A	100A	150A	200A	250A	Max	Min	Δ V	Max Δ V
1	30-34	11.7	11.7	11.7	11.7	11.7	11.7	11.6	11.7	11.6	0.1	4.5
2	34-45	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	0.0	
3	45-60	10.1	10.1	10.1	10.1	10.1	10.2	10.1	10.2	10.1	0.1	
4	60-80	9.9	9.8	9.8	9.9	9.9	9.5	9.4	9.9	9.4	0.5	
5	80-100	9.9	9.9	9.9	9.9	10.0	10.1	10.0	10.1	9.9	0.2	
6	100-130	13.1	13.2	14.0	13.8	13.7	14.5	15.9	15.9	13.1	2.8	
7	130-170	14.8	15.0	16.8	16.8	17.3	17.6	19.3	19.3	14.8	4.5	
8	170-225	16.2	16.2	16.3	16.1	16.4	15.8	17.2	17.2	15.8	1.4	
9	225-300	25.4	25.5	25.4	25.8	25.8	26.3	25.8	26.3	25.4	0.9	
10	300-400	19.5	19.5	19.5	19.6	19.5	19.5	19.8	19.8	19.5	0.3	
11	400-525	23.8	23.8	23.8	23.8	23.8	23.8	23.8	23.8	23.8	0.0	
12	525-700	25.5	25.5	25.5	25.5	25.5	25.5	25.7	25.7	25.5	0.2	
13	700-850	27.2	27.2	27.2	27.2	27.2	27.2	27.2	27.2	27.2	0.0	
14	850-1000	28.7	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.6	0.1	

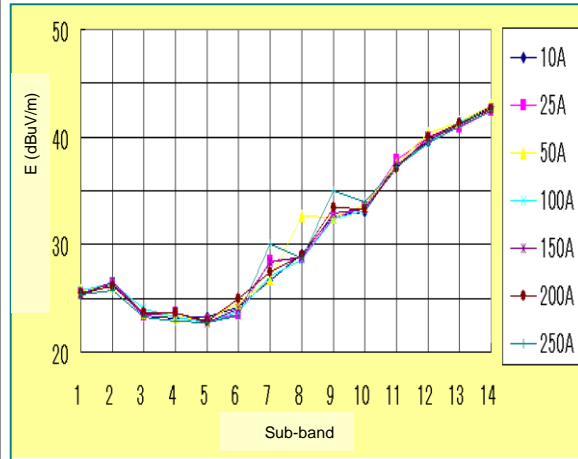
Radiated emissions

(1) Horizontal polarization

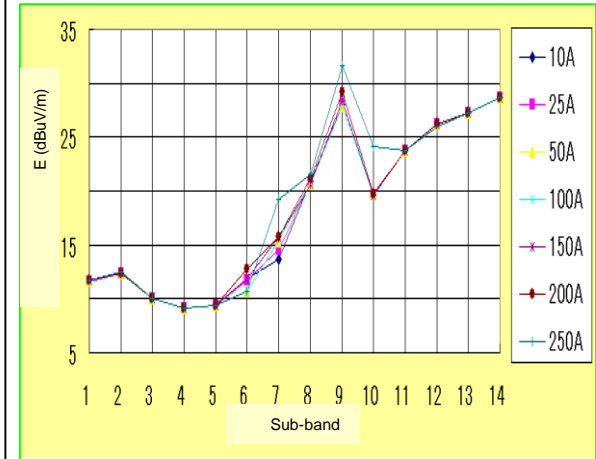
① QP: $\Delta V=3.9\text{dB}$



② PK: $\Delta V=4.1\text{dB}$

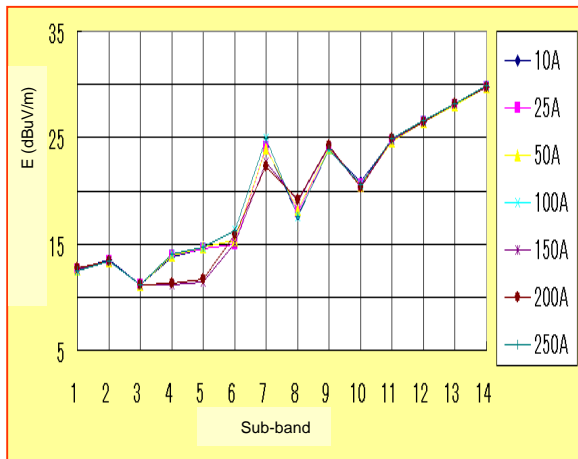


③ AV: $\Delta V=5.6\text{dB}$

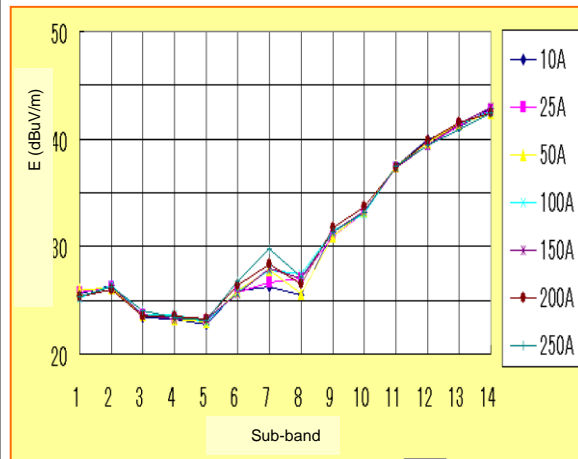


(2) Vertical polarization

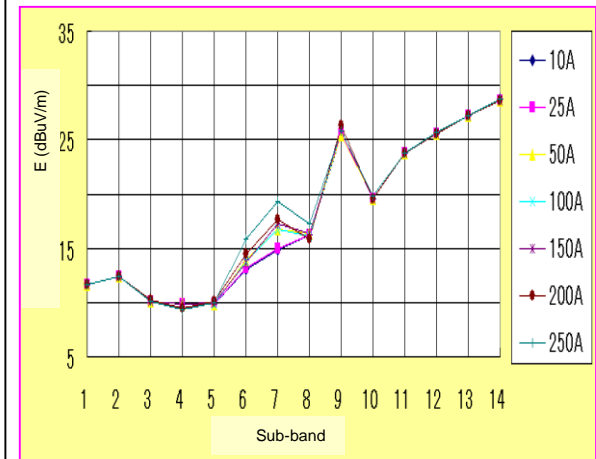
① QP: $\Delta V=3.3\text{dB}$



② PK: $\Delta V=3.5\text{dB}$



③ AV: $\Delta V=4.5\text{dB}$



Contents

1. Radiated emissions $\geq 30\text{MHz}$

DUT : Prototype EV 1

Measurement site: ALSE 1

2. Radiated emissions $\geq 30\text{MHz}$

DUT : Prototype EV 2

Measurement site: ALSE 2

3. Conducted emissions $\leq 30\text{MHz}$

DUT : Prototype EV 1

Measurement site: ALSE 1

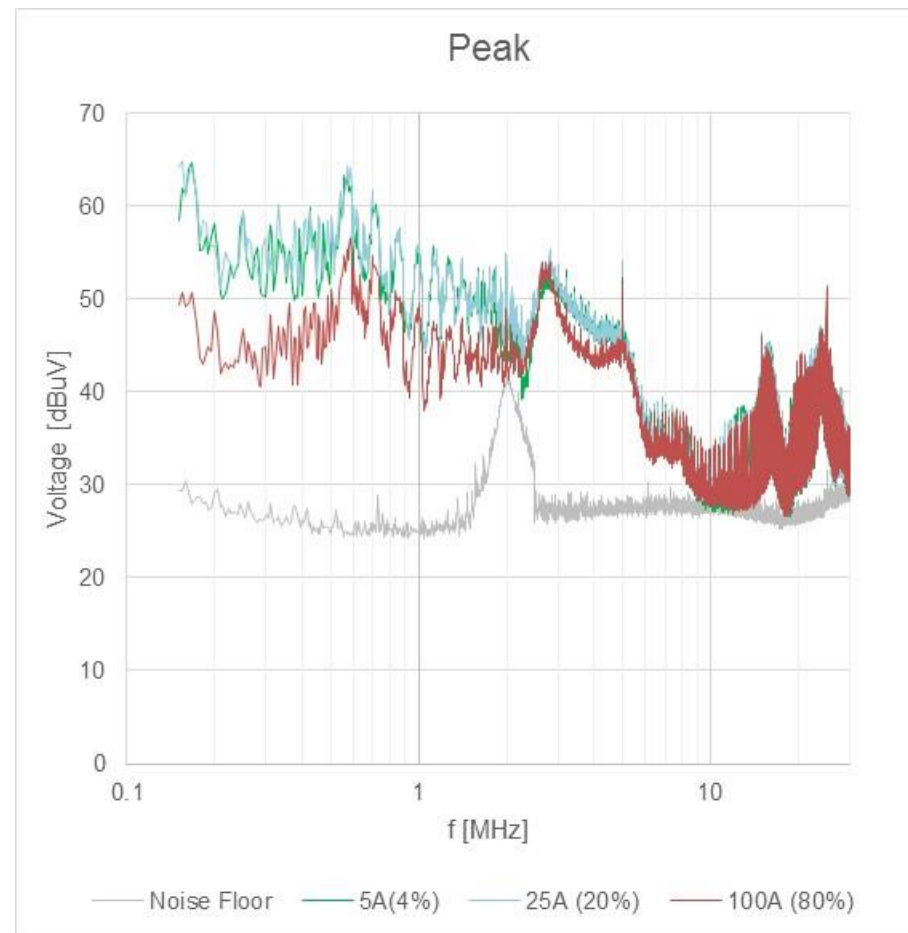
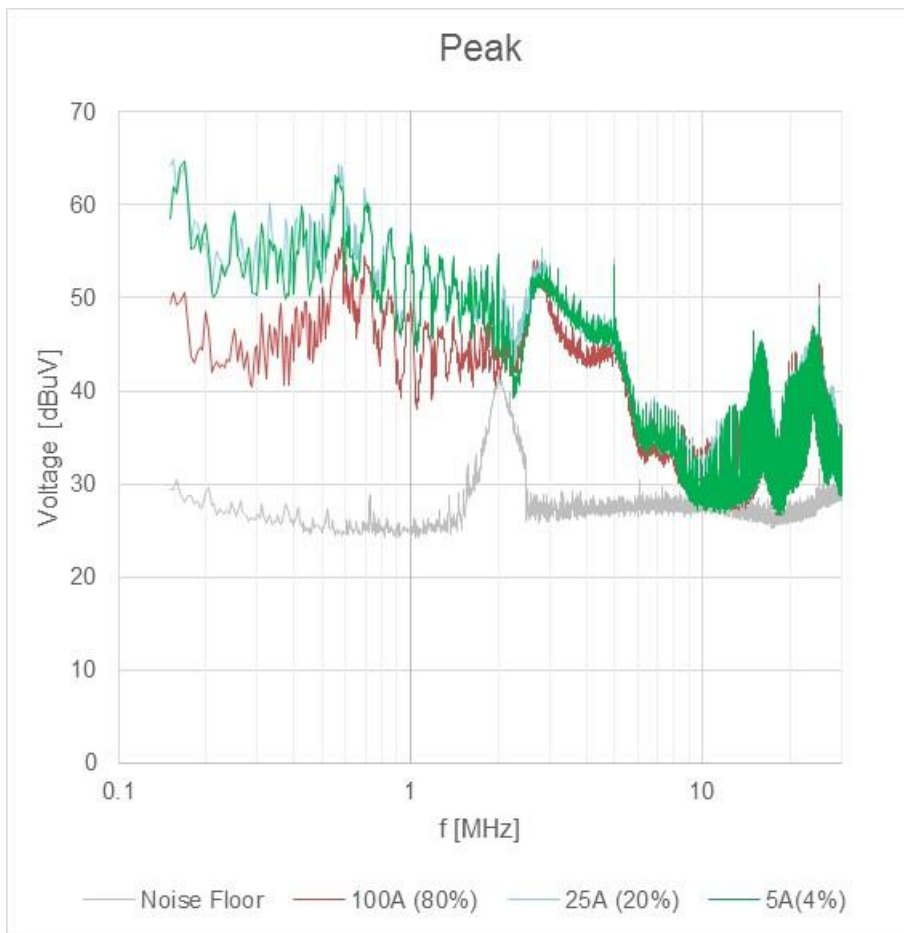
4. Conducted emissions $\leq 30\text{MHz}$

DUT : Prototype EV 2

Measurement site: ALSE 2

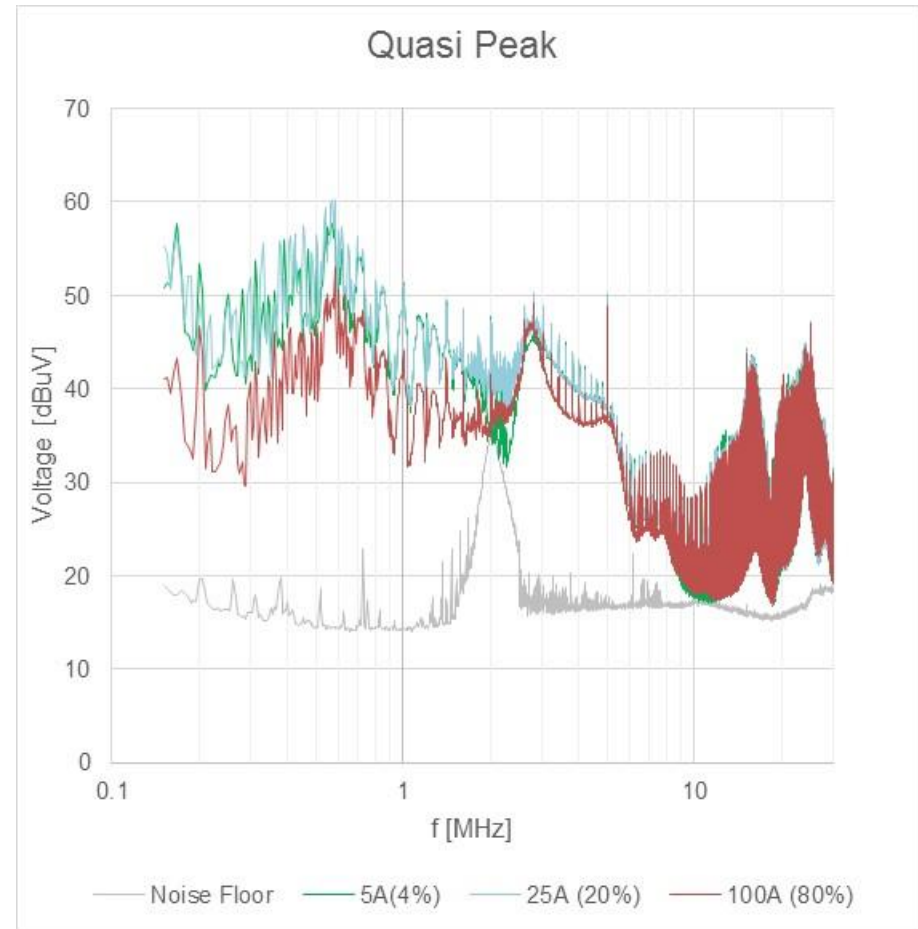
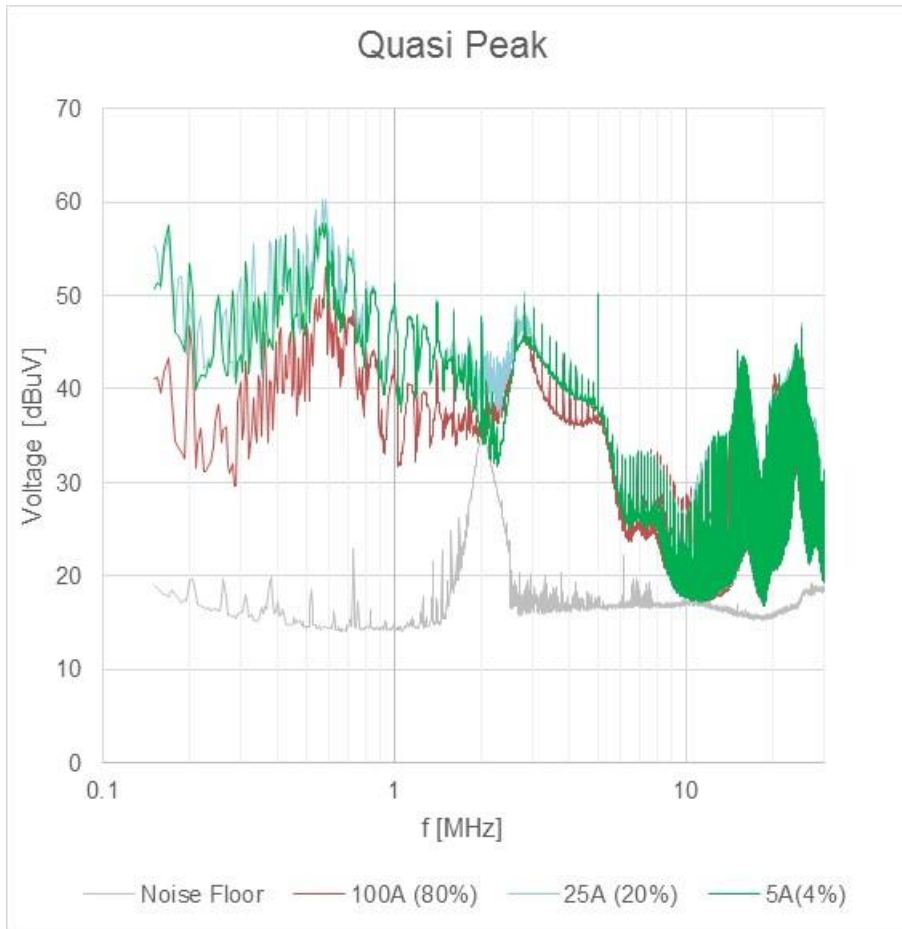
Conducted emissions

DUT : Prototype EV
DC charger : CHAdeMO type
Test setup : R10
SOC : <30%
Charging current : 4%, 20% and 80%
Measuring system: FFT based
Detector : Peak
Dwell time : 2 s/sub-band (0,15-0,25/0,25-0.5/0,5-1/1-5/5-10/10-20/20-30MHz)



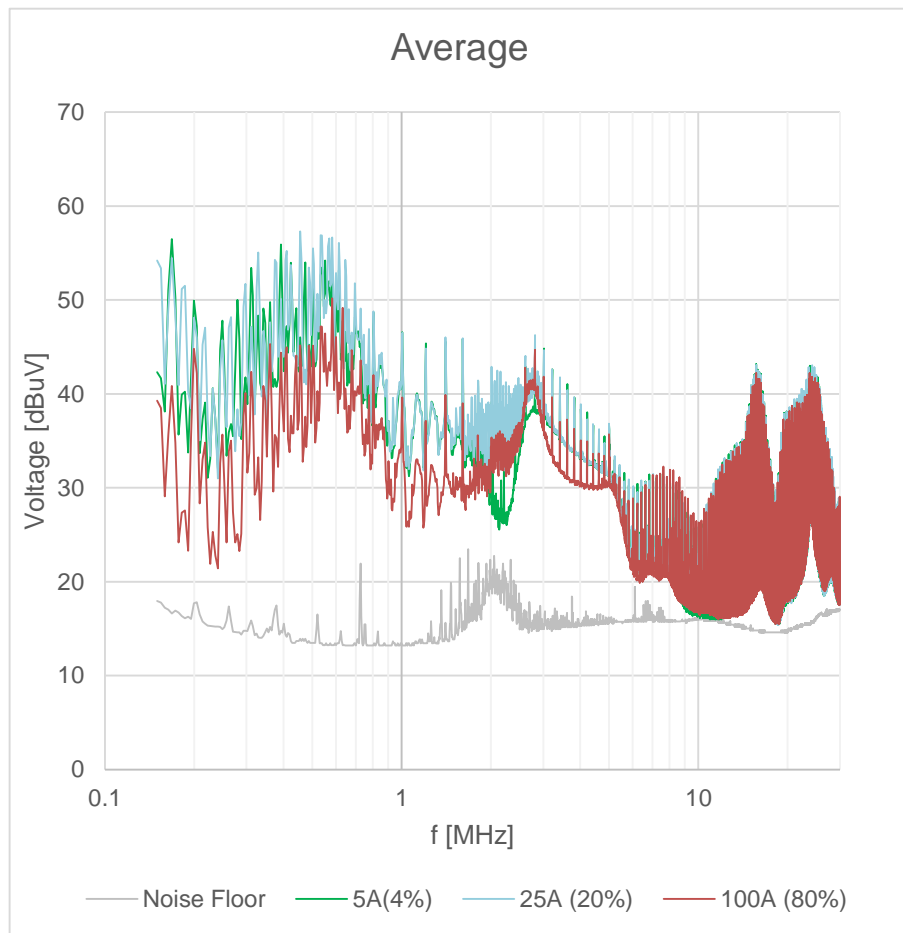
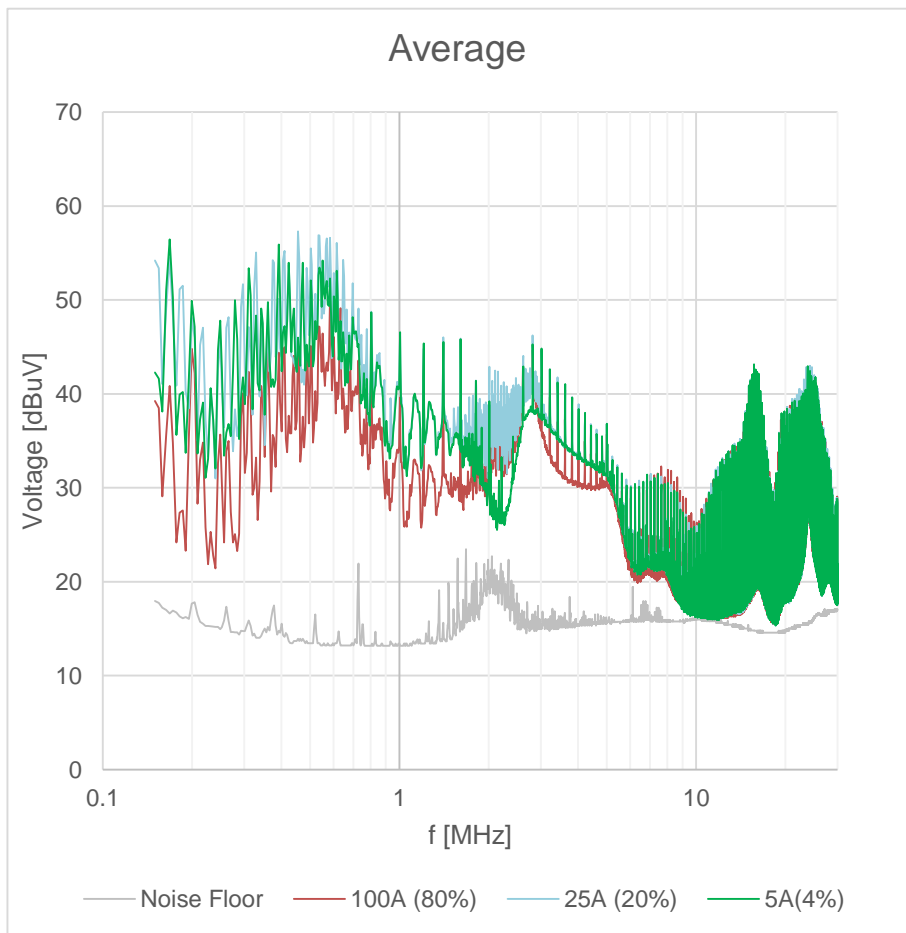
Conducted emissions

DUT : Prototype EV
DC charger : CHAdeMO type
Test setup : R10
SOC : <30%
Charging current : 4%, 20% and 80%
Measuring system: FFT based
Detector : Quasi Peak
Dwell time : 2 s/sub-band (0,15-0,25/0,25-0.5/0,5-1/1-5/5-10/10-20/20-30MHz)



Conducted emissions

DUT : Prototype EV
DC charger : CHAdeMO type
Test setup : R10
SOC : <30%
Charging current : 4%, 20% and 80%
Measuring system: FFT based
Detector : Average
Dwell time : 2 s/sub-band (0,15-0,25/0,25-0.5/0,5-1/1-5/5-10/10-20/20-30MHz)



Contents

1. Radiated emissions $\geq 30\text{MHz}$

DUT : Prototype EV 1

Measurement site: ALSE 1

2. Radiated emissions $\geq 30\text{MHz}$

DUT : Prototype EV 2

Measurement site: ALSE 2

3. Conducted emissions $\leq 30\text{MHz}$

DUT : Prototype EV 1

Measurement site: ALSE 1

4. Conducted emissions $\leq 30\text{MHz}$

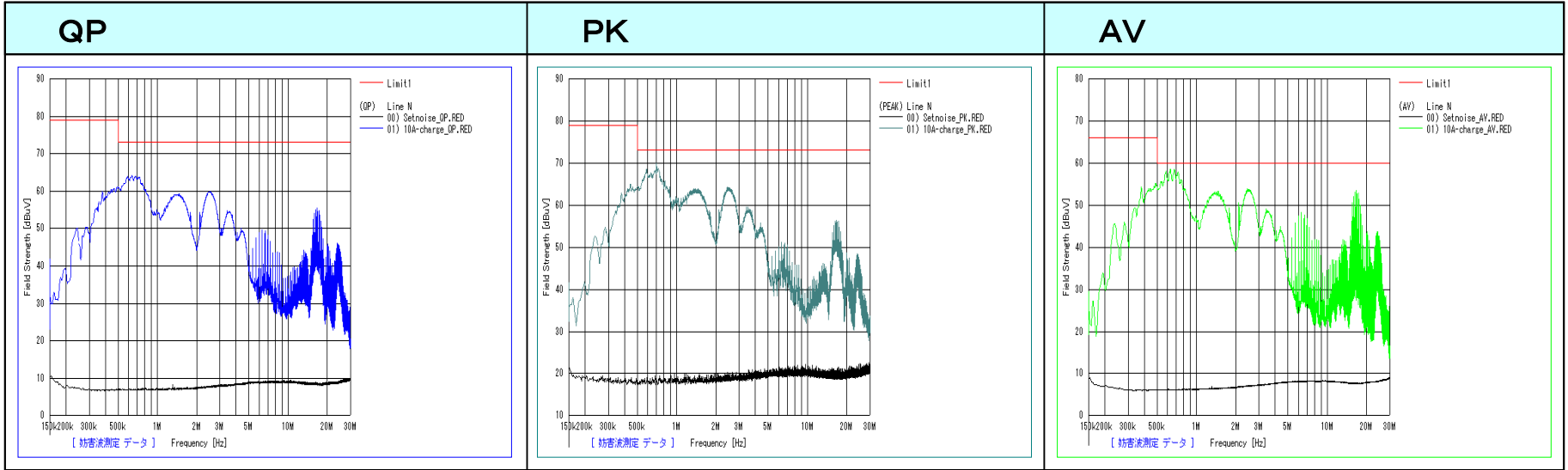
DUT : Prototype EV 2

Measurement site: ALSE 2

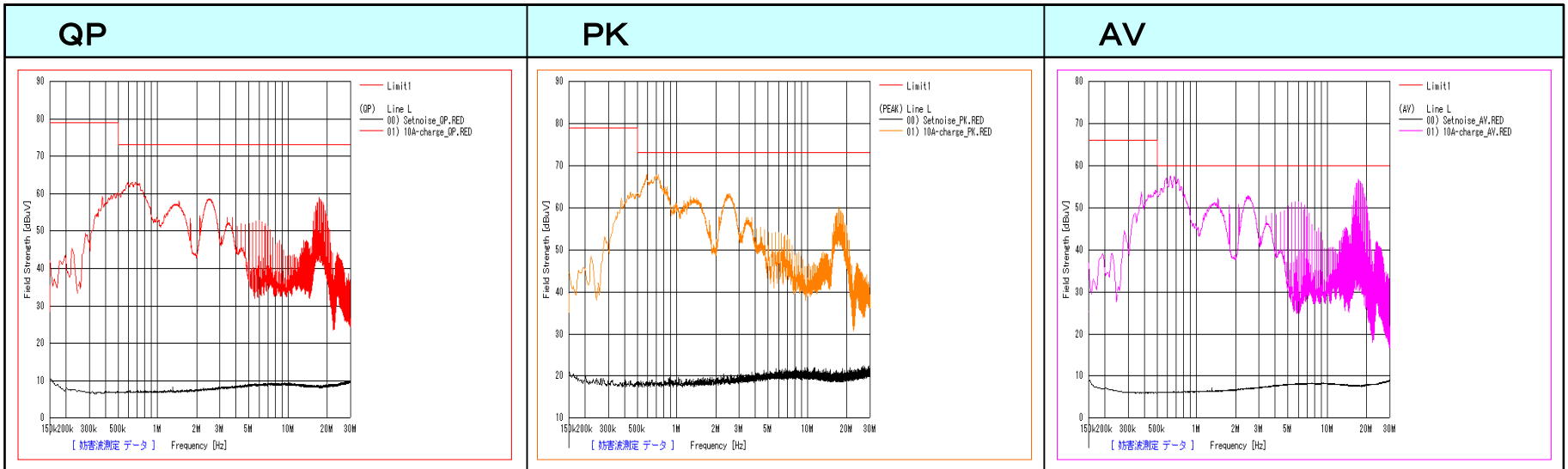
Conducted emissions at 10A

DC charger : Prototype CHAdEMO
 Test setup : R10
 SOC : 20-30%
 Charging current : 10A, 25A, 50A, 100A, 150A, 200A, 250A
 Measuring system: FFT based
 Dwell time & scan : 1 s/sub-band, maxhold with 3 scans

(1) DC+



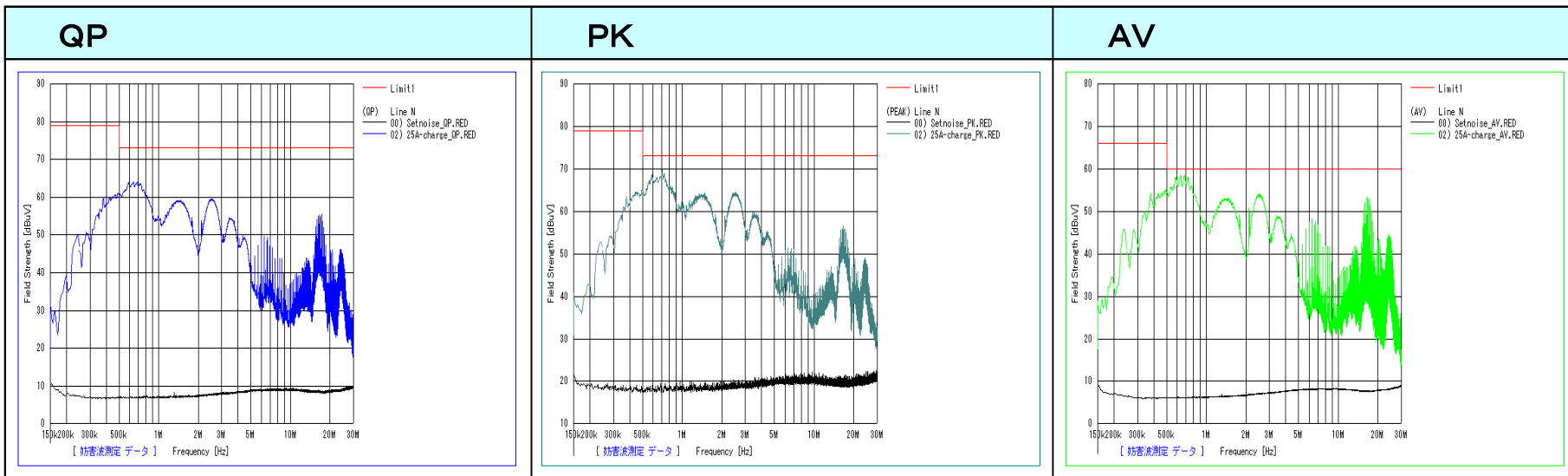
(2) DC-



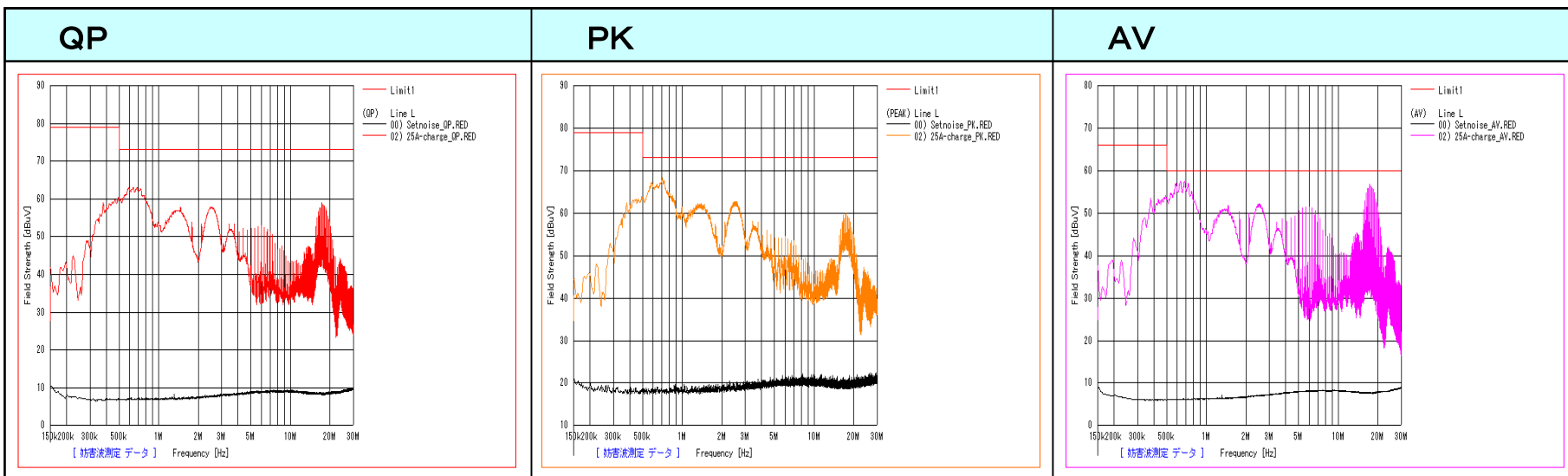
Conducted emissions at 25A

DC charger : Prototype CHAdEMO
 Test setup : R10
 SOC : 20-30%
 Charging current : 10A, 25A, 50A, 100A, 150A, 200A, 250A
 Measuring system: FFT based
 Dwell time & scan : 1 s/sub-band, maxhold with 3 scans

(1) DC+



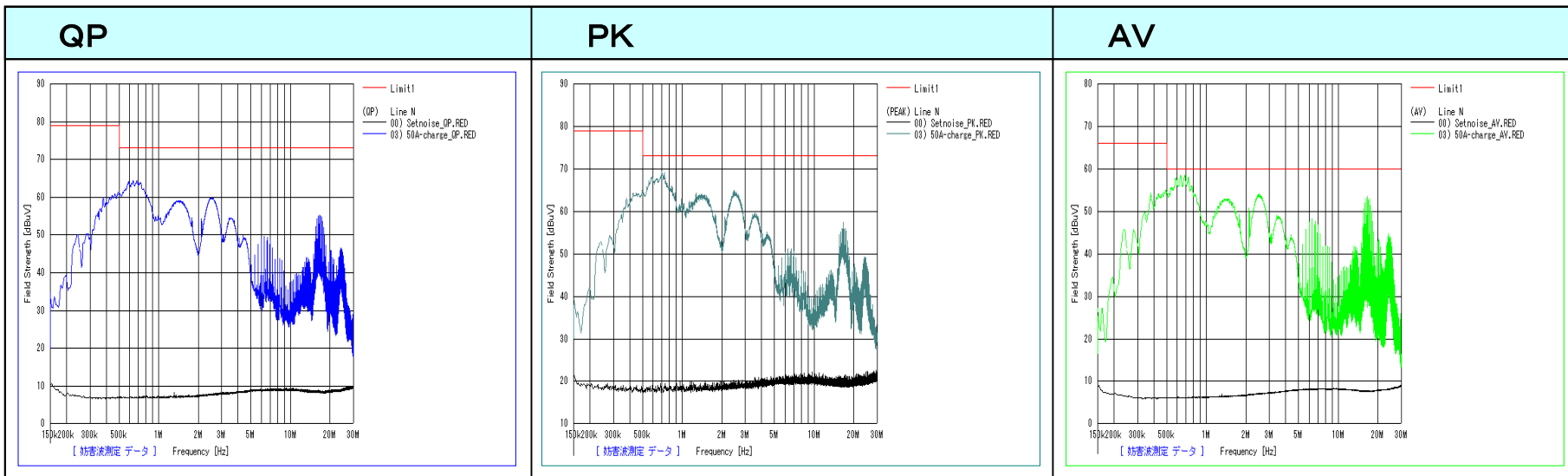
(2) DC-



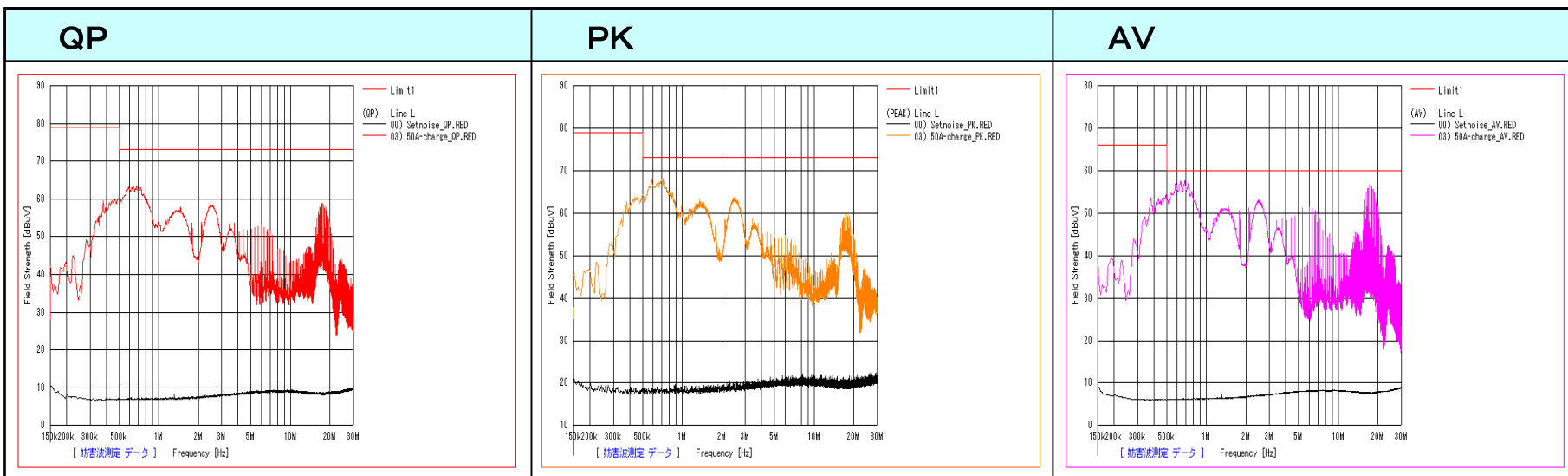
Conducted emissions at 50A

DC charger : Prototype CHAdeMO
 Test setup : R10
 SOC : 20-30%
 Charging current : 10A, 25A, 50A, 100A, 150A, 200A, 250A
 Measuring system: FFT based
 Dwell time & scan : 1 s/sub-band, maxhold with 3 scans

(1) DC+



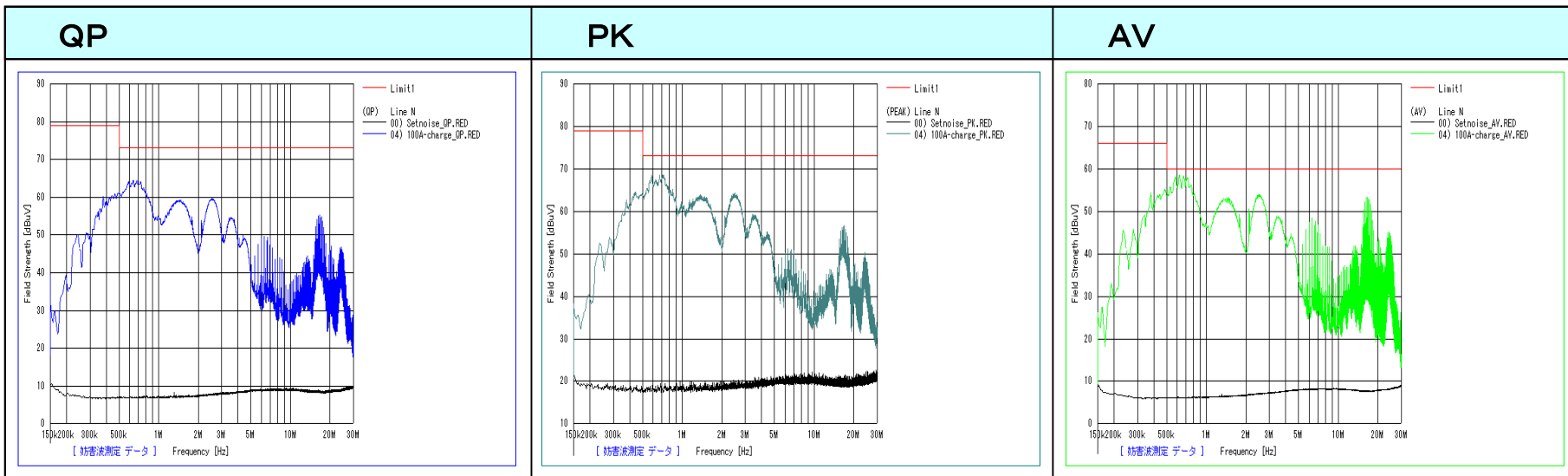
(2) DC-



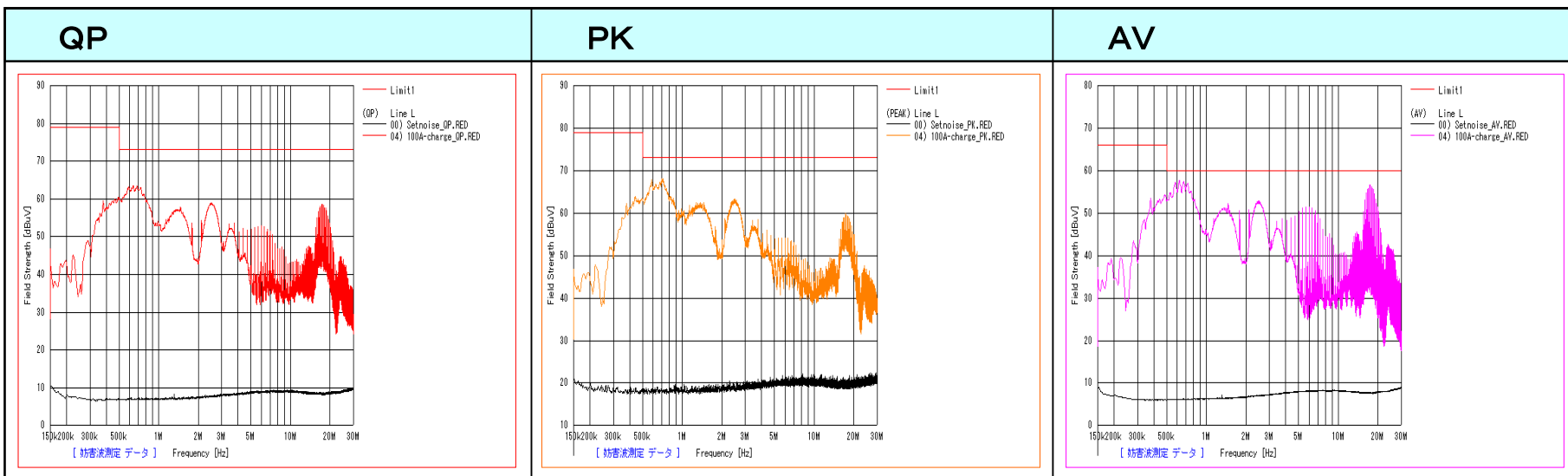
Conducted emissions at 100A

DC charger : Prototype CHAdEMO
 Test setup : R10
 SOC : 20-30%
 Charging current : 10A, 25A, 50A, 100A, 150A, 200A, 250A
 Measuring system: FFT based
 Dwell time & scan : 1 s/sub-band, maxhold with 3 scans

(1) DC+



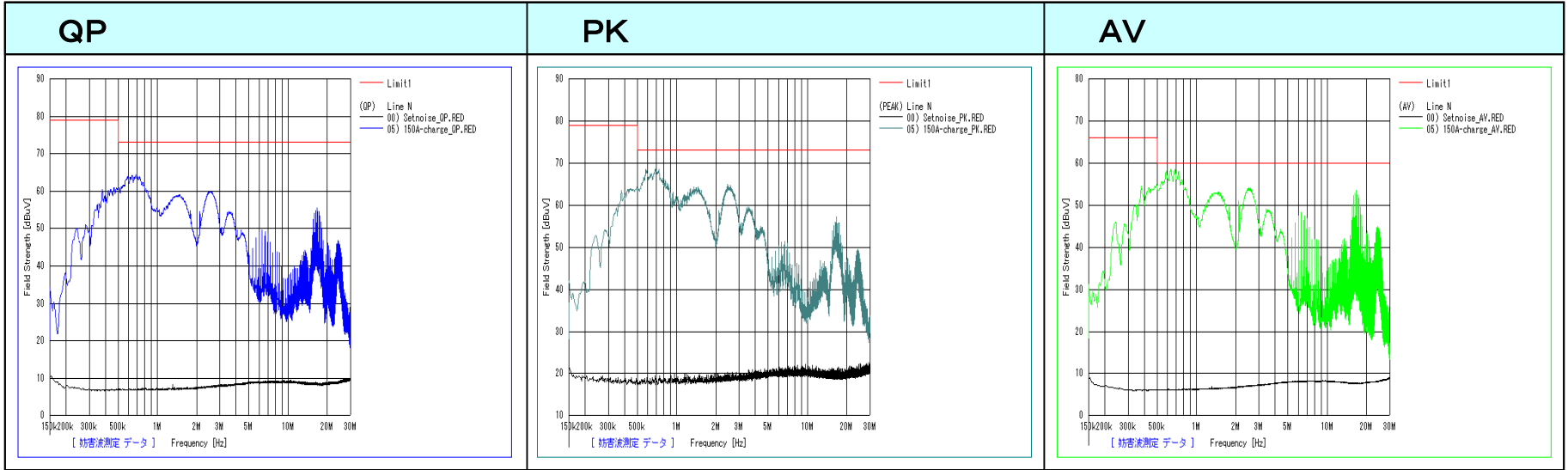
(2) DC-



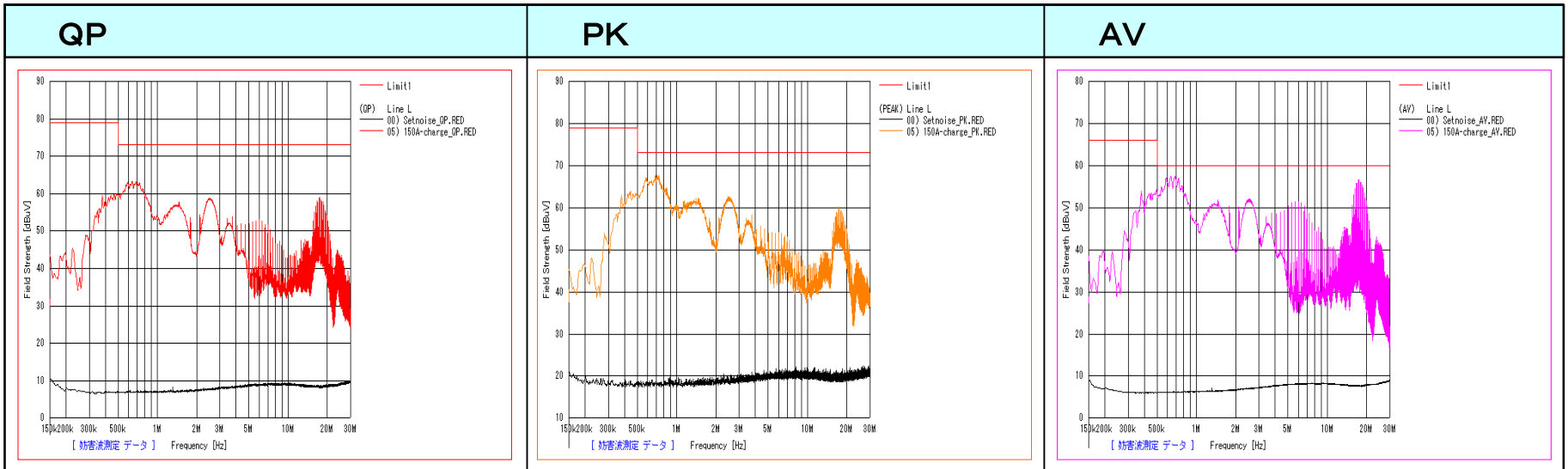
Conducted emissions at 150A

DC charger : Prototype CHAdEMO
 Test setup : R10
 SOC : 20-30%
 Charging current : 10A, 25A, 50A, 100A, 150A, 200A, 250A
 Measuring system: FFT based
 Dwell time & scan : 1 s/sub-band, maxhold with 3 scans

(1) DC+



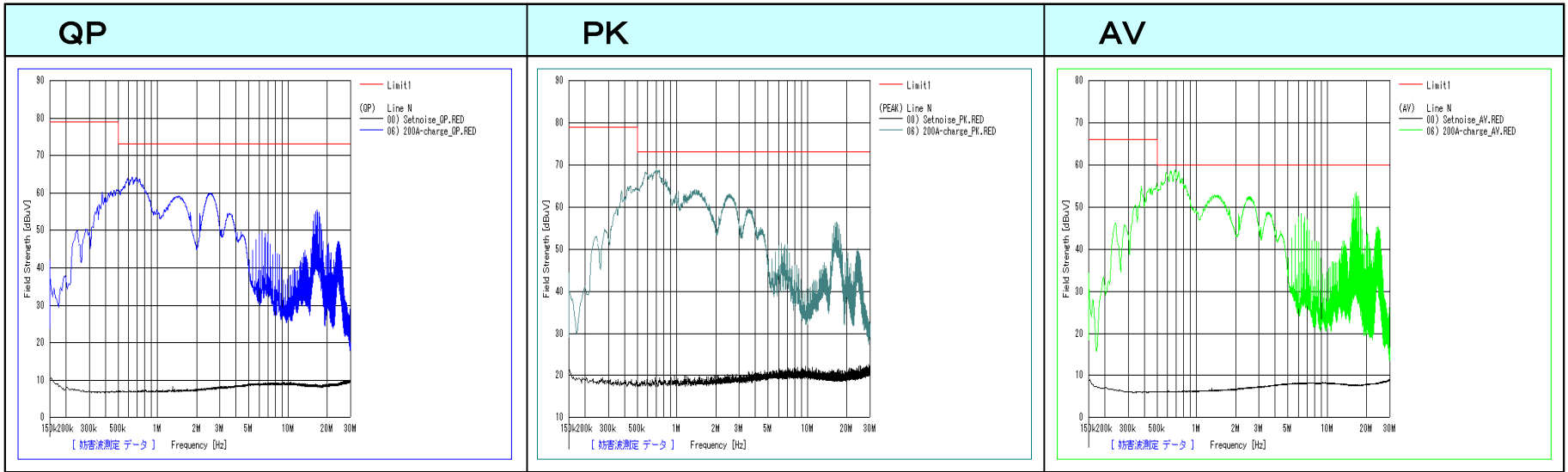
(2) DC-



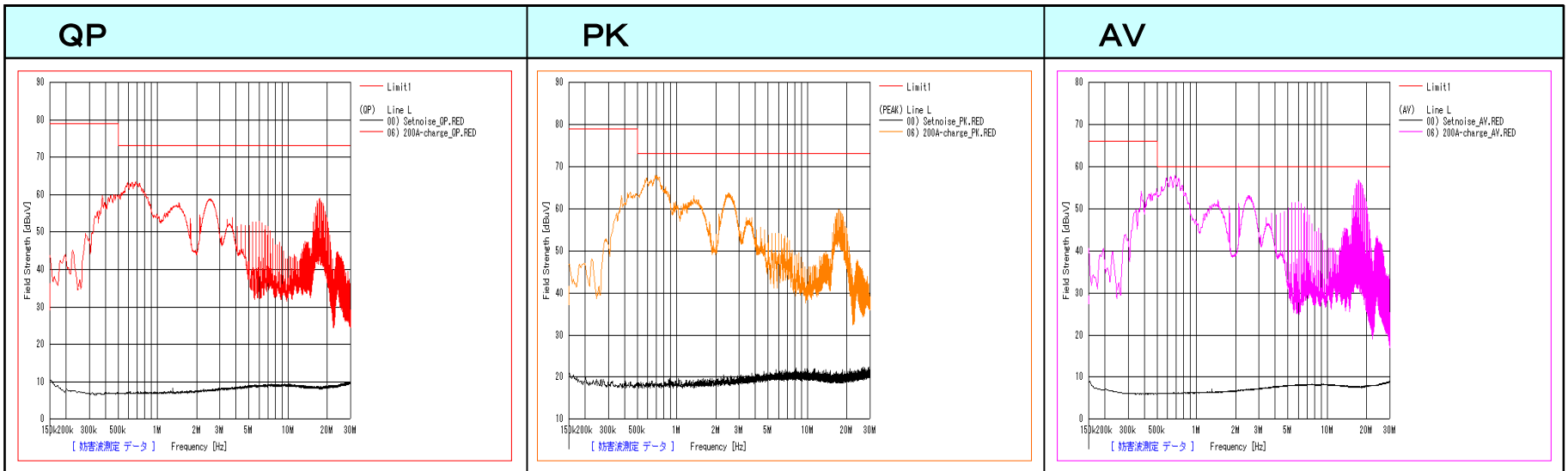
Conducted emissions at 200A

DC charger : Prototype CHAdeMO
 Test setup : R10
 SOC : 20-30%
 Charging current : 10A, 25A, 50A, 100A, 150A, 200A, 250A
 Measuring system: FFT based
 Dwell time & scan : 1 s/sub-band, maxhold with 3 scans

(1) DC+



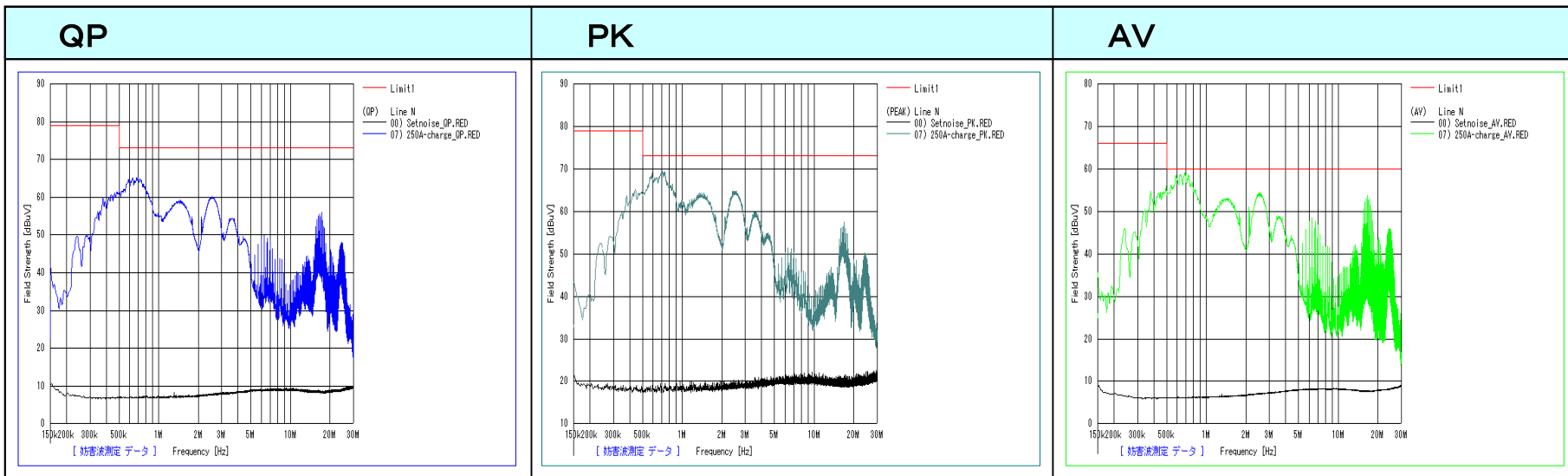
(2) DC-



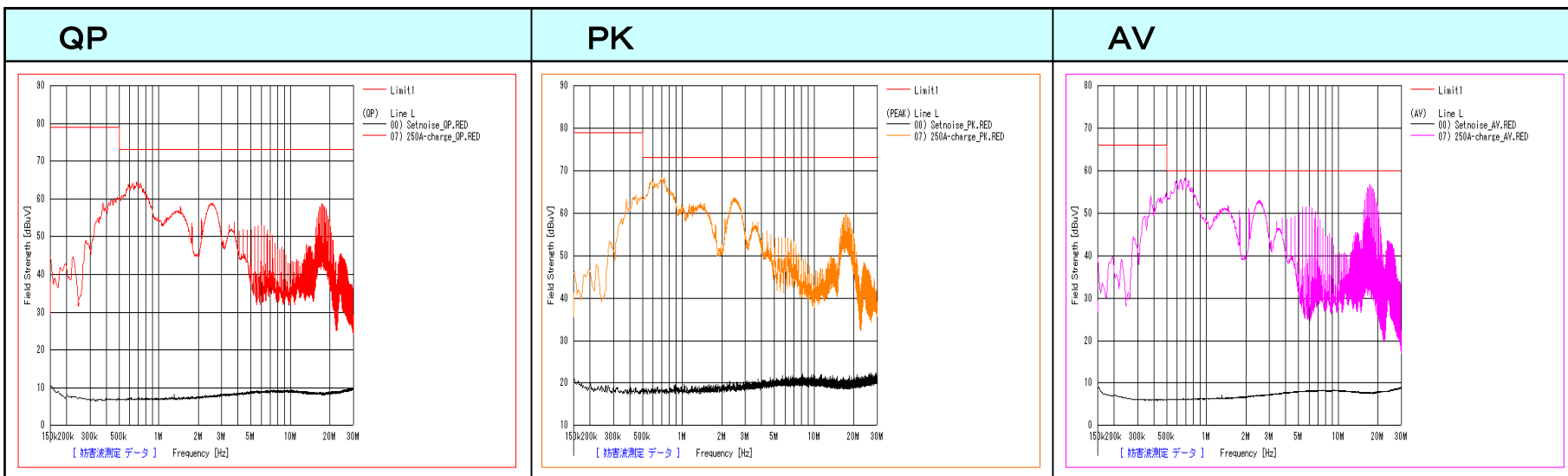
Conducted emissions at 250A

DC charger : Prototype CHAdEMO
 Test setup : R10
 SOC : 20-30%
 Charging current : 10A, 25A, 50A, 100A, 150A, 200A, 250A
 Measuring system: FFT based
 Dwell time & scan : 1 s/sub-band, maxhold with 3 scans

(1) DC+



(2) DC-



Synthesis table : Conducted emissions **QP**

Line	Freq.		Level (dB μ V)							Δ V (dB)			
	Sub-band		Charging current							Δ V = max - min			
	No.	(MHz)	10A	25A	50A	100A	150A	200A	250A	Max	Min	Δ V	Max Δ V
DC+	1	0.15-0.25	50.1	49.9	50.1	50.2	50.2	50.0	49.7	50.2	49.7	0.5	2.0
	2	0.25-0.5	61.2	61.1	61.3	61.2	60.9	60.8	61.3	61.3	60.8	0.5	
	3	0.5-1.1	64.1	64.0	64.4	64.5	64.3	64.1	65.2	65.2	64.0	1.2	
	4	1.1-2.4	59.3	59.2	59.1	59.2	59.0	59.2	59.3	59.3	59.0	0.3	
	5	2.4-5	59.9	59.5	59.9	59.6	59.9	59.9	60.1	60.1	59.5	0.6	
	6	5-10	49.7	49.7	49.7	49.7	49.7	49.8	49.9	49.9	49.7	0.2	
	7	10-20	55.4	55.4	55.3	55.3	55.4	55.4	55.9	55.9	55.3	0.6	
	8	20-30	46.1	46.0	46.6	47.0	46.9	47.1	48.0	48.0	46.0	2.0	
DC-	1	0.15-0.25	45.3	44.9	44.9	47.0	45.4	45.2	44.7	47.0	44.7	2.3	2.3
	2	0.25-0.5	60.2	60.3	60.2	60.4	59.9	60.0	60.3	60.4	59.9	0.5	
	3	0.5-1.1	63.1	63.1	63.5	63.4	63.2	63.4	64.4	64.4	63.1	1.3	
	4	1.1-2.4	58.1	57.8	57.8	58.0	57.8	57.9	58.1	58.1	57.8	0.3	
	5	2.4-5	58.6	57.9	58.4	58.9	58.8	58.8	58.8	58.9	57.9	1.0	
	6	5-10	52.8	52.8	53.4	52.9	53.2	52.8	53.0	53.4	52.8	0.6	
	7	10-20	59.1	59.0	58.8	58.6	59.1	59.1	58.8	59.1	58.6	0.5	
	8	20-30	52.6	52.6	52.4	52.4	52.7	52.7	52.6	52.7	52.4	0.3	

Synthesis table : Conducted emissions PK

Line	Freq.		Level (dB μ V)							Δ V (dB)			
	Sub-band		Charging current							Δ V = max - min			
	No.	(MHz)	10A	25A	50A	100A	150A	200A	250A	Max	Min	Δ V	Max Δ V
DC+	1	0.15-0.25	51.7	52.8	52.9	52.5	52.8	53.0	52.5	53.0	51.7	1.3	1.8
	2	0.25-0.5	65.1	65.1	65.0	64.5	64.3	65.0	65.2	65.2	64.3	0.9	
	3	0.5-1.1	69.6	69.8	69.3	68.6	68.6	69.1	69.4	69.8	68.6	1.2	
	4	1.1-2.4	64.3	64.4	64.4	63.9	64.3	64.1	64.4	64.4	63.9	0.5	
	5	2.4-5	64.7	64.6	64.9	64.3	64.9	63.1	64.8	64.9	63.1	1.8	
	6	5-10	51.5	51.3	51.2	51.2	51.3	51.3	51.4	51.5	51.2	0.3	
	7	10-20	56.9	56.4	57.4	56.6	57.3	56.4	57.4	57.4	56.4	1.0	
	8	20-30	50.3	49.0	49.4	50.3	49.5	50.2	50.1	50.3	49.0	1.3	
DC-	1	0.15-0.25	48.4	48.1	48.5	47.8	48.0	48.1	48.0	48.5	47.8	0.7	1.2
	2	0.25-0.5	64.2	63.9	64.1	63.9	64.0	63.9	64.3	64.3	63.9	0.4	
	3	0.5-1.1	68.2	68.2	68.1	68.1	67.7	67.9	68.3	68.3	67.7	0.6	
	4	1.1-2.4	62.6	62.3	63.2	62.8	62.2	63.2	62.7	63.2	62.2	1.0	
	5	2.4-5	63.2	62.7	63.7	63.3	62.7	63.8	63.5	63.8	62.7	1.1	
	6	5-10	54.4	54.6	54.7	54.2	54.2	54.0	54.3	54.7	54.0	0.7	
	7	10-20	60.2	59.9	60.2	59.9	60.2	59.8	60.1	60.2	59.8	0.4	
	8	20-30	54.0	54.1	53.8	55.0	53.9	53.9	53.9	55.0	53.8	1.2	

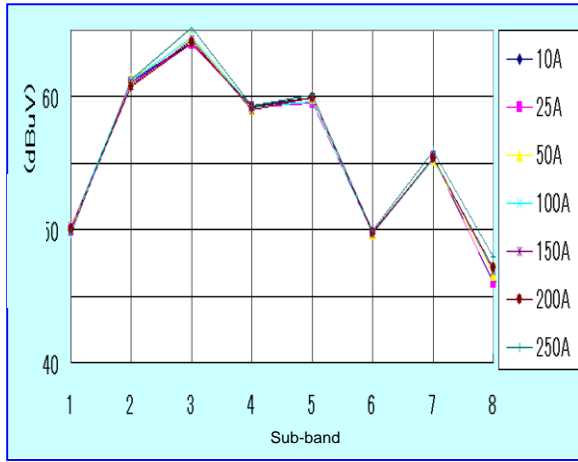
Synthesis table : Conducted emissions **AV**

Line	Freq.		Level (dB μ V)							Δ V (dB)			
	Sub-band		Charging current							Δ V = max - min			
	No.	(MHz)	10A	25A	50A	100A	150A	200A	250A	Max	Min	Δ V	Max Δ V
DC+	1	0.15–0.25	44.6	45.8	45.8	45.6	46.0	46.1	46.0	46.1	44.6	1.5	2.1
	2	0.25–0.5	56.0	55.2	55.0	55.1	54.9	55.6	55.9	56.0	54.9	1.1	
	3	0.5–1.1	58.8	58.6	58.5	58.4	58.5	58.8	59.1	59.1	58.4	0.7	
	4	1.1–2.4	53.8	53.0	52.9	53.3	53.1	52.9	53.1	53.8	52.9	0.9	
	5	2.4–5	54.3	54.1	54.1	53.9	54.2	52.5	54.3	54.3	52.5	1.8	
	6	5–10	48.5	48.3	48.3	48.4	48.3	48.4	48.4	48.5	48.3	0.2	
	7	10–20	53.7	53.3	53.4	53.3	53.5	53.5	53.6	53.7	53.3	0.4	
	8	20–30	46.6	44.5	44.7	45.2	44.9	45.3	45.9	46.6	44.5	2.1	
DC–	1	0.15–0.25	39.2	38.9	39.3	39.5	40.0	40.5	39.7	40.5	38.9	1.6	1.6
	2	0.25–0.5	55.0	54.1	54.3	54.4	54.4	54.7	54.7	55.0	54.1	0.9	
	3	0.5–1.1	57.9	57.5	57.6	57.6	57.5	57.8	58.2	58.2	57.5	0.7	
	4	1.1–2.4	52.7	51.9	52.1	52.3	51.9	52.0	51.9	52.7	51.9	0.8	
	5	2.4–5	53.0	52.2	53.0	52.9	52.1	53.0	53.0	53.0	52.1	0.9	
	6	5–10	51.8	51.5	51.5	51.5	51.5	51.6	51.7	51.8	51.5	0.3	
	7	10–20	56.9	56.8	56.7	56.7	56.7	56.9	56.9	56.9	56.7	0.2	
	8	20–30	50.4	50.2	50.1	50.4	50.4	50.3	50.3	50.4	50.1	0.3	

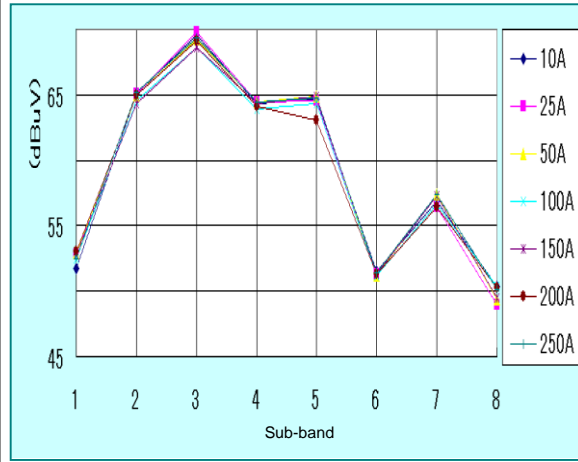
Conducted emissions

(1) DC+

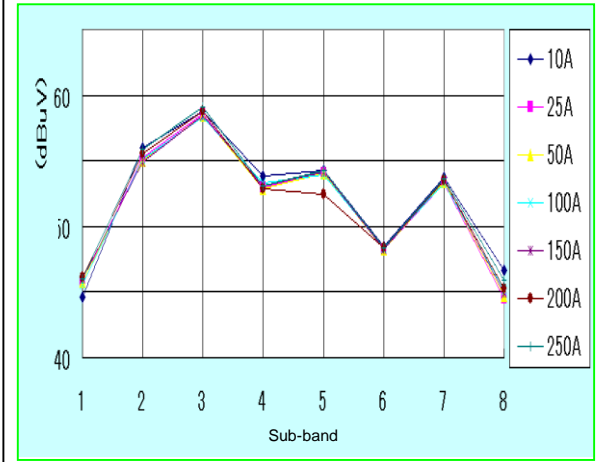
① QP: $\Delta V=2.0\text{dB}$



② PK: $\Delta V=1.8\text{dB}$

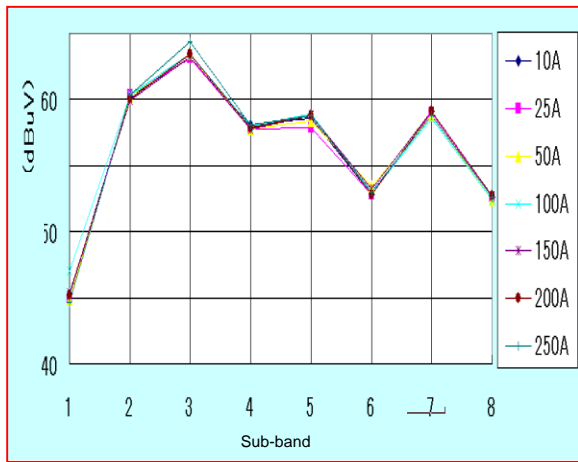


③ AV: $\Delta V=2.1\text{dB}$

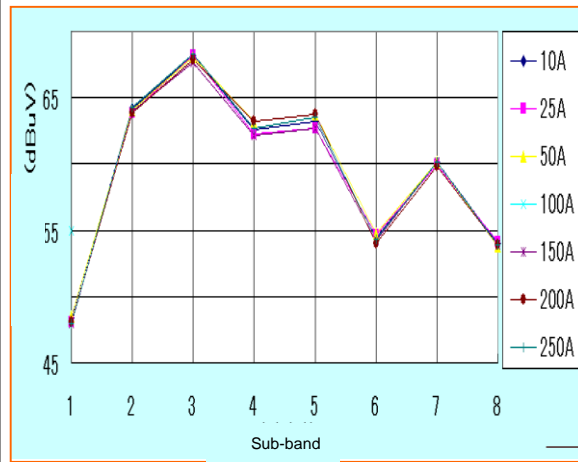


(2) DC-

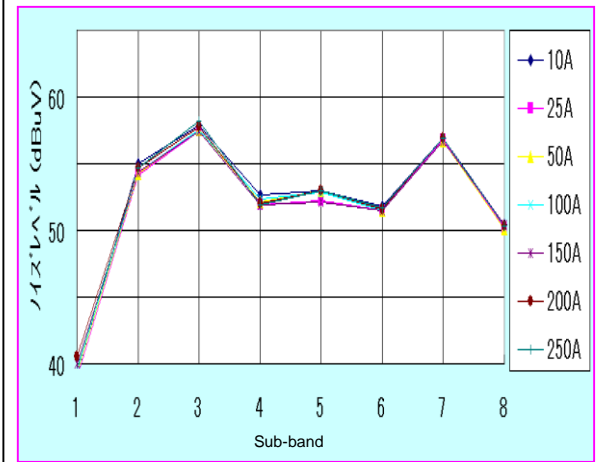
① QP: $\Delta V=2.3\text{dB}$



② PK: $\Delta V=1.2\text{dB}$



③ AV: $\Delta V=1.6\text{dB}$



Proposal

According to the measured results, emission levels are considered as to be charging current almost independent.

➔ This suggests to allow us to perform RE tests (and also CE tests) in DC charging mode with no current because the magnitude of disturbance is independent of current setting even for the future high power DC charging.

The level of disturbance is not related to charging current but to vehicle source like, DC/DC converter, heater, cooling fan (battery), ... That is why we prefer to allow DC charging equal to 0. What is very important is the representative load (internal impedance) of off-board charger and also to emulate communication correctly.

Appendix 1

Noise Floor
in the radiated emission measurements

Measurement site: ALSE 1

Background noise

