Additional report

for EB-TX210 / EB-TX220

(FCC ID NWJ10A002A)

Table of Contents

1. Overview

This report is the answer from FCC to the questions about our package that was uploaded on May 10th 2000.

2. Measurement result of body worn test

2.1. Measurement Setup

The generic twin phantom (made by S&P EAG) that has right head, left head and flat portion is used. For body worn SAR, especially, flat portion is available as figs.1 and 2.
A soft holster or leather carry case that mobile phone is put into is placed as fig.3. A soft holster is used for EB-TX220, and a leather carry case is used for EB-TX210, respectively. Also, the mobile phone is installed to the bottom of the phantom and earpiece of private handsfree headset is adhered under the ear of the bottom of the right head.

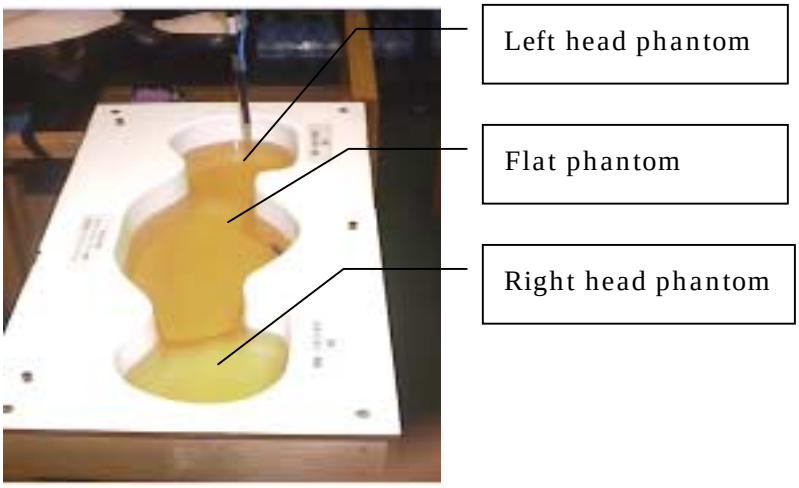

Fig.1 Picture of generic twin phantom

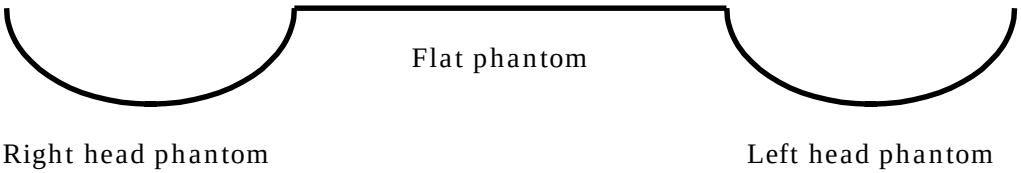

Fig.2 The sectional diagram of generic twin phantom

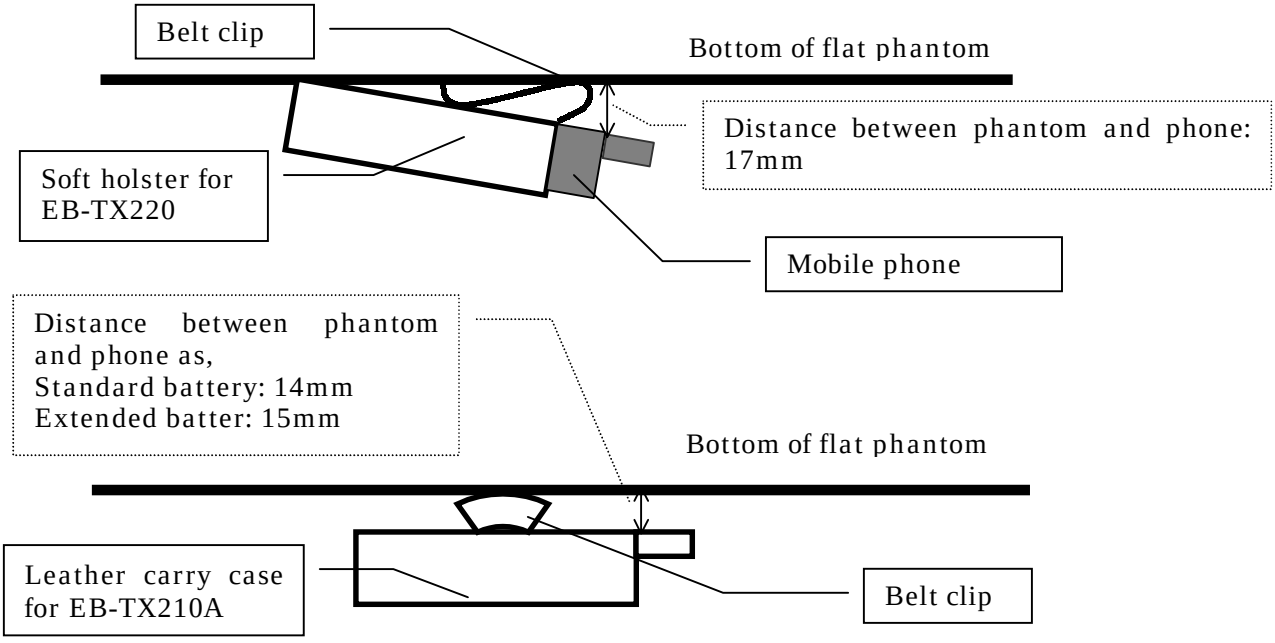

Fig.3 Measurement set up mobile phone under the body worn test

2.2. Result

Model	EB-TX210		EB-TX220
Channel / Battery type	Standard	Extended	Standard
991ch	0.946	1.03	1.03
380ch	1.29	1.36	1.29
799ch	1.04	1.02	0.823

Table1: Measurement body worn SAR_{1g} results at AMPS mode
(900 MHz, Permitivity= 53.97,Conductivity= 1.24 S/m and density= 1.0 g/cm^3).

Model	EB-TX210		EB-TX220
Channel / Battery type	Standard	Extended	Standard
991ch	0.414	0.461	0.526
380ch	0.630	0.660	0.624
799ch	0.504	0.537	0.494

Table2: Measurement body worn SAR_{1g} results at 800MHz TDMA mode
(900 MHz, Permitivity = 53.97,Conductivity= 1.24 S/m and density= 1.0 g/cm^3).

Model	EB-TX210		EB-TX220
Channel / Battery type	Standard	Extended	Standard
2ch	0.466	0.407	0.422
1000ch	0.387	0.475	0.470
1998ch	0.383	0.440	0.356

Table3: Measurement body worn SAR_{1g} results at 1900MHz TDMA mode
(1800 MHz, Permitivity = 52.47,Conductivity= 1.666 S/m and density= 1.0 g/cm^3).

3. Measurements result of brain SAR using extended battery

Two kinds of batteries, one is called standard the other is extended are provided for EB-TX210. On the previous test report, data of brain SAR with extended battery was missed. Data below is the result.

Channel / Head	Right	Left
991ch	0.940	0.893
380ch	1.40	1.31
799ch	0.873	0.845

Table4: SAR_{1g} results for AMPS mode of EB-TX210 with extended battery (900 MHz, Permitivity = 42.83,Conductivity= 0.826 S/m and density= 1.0 g/cm^3).

Channel / Head	Right	Left
991ch	0.548	0.524
380ch	0.772	0.731
799ch	0.641	0.613

Table5: SAR_{1g} results for 800MHz TDMA mode of EB-TX210 with extended battery (900 MHz, Permitivity = 42.83,Conductivity= 0.826 S/m and density= 1.0 g/cm^3).

Channel / Head	Right	Left
2ch	1.41	1.30
1000ch	1.21	1.16
1998ch	1.08	1.01

Table6: SAR_{1g} results for 1900MHz mode of EB-TX210 with extended battery (1900 MHz, Permitivity = 39.64,Conductivity= 1.639 S/m and density= 1.0 g/cm^3).

Refer section 6 for plot data.

4. Dipole validation data

The dipole antenna is placed under the flat phantom. The distance between the phantom and dipole antenna for 800MHz is 30mm and for 1800MHz is 20mm.

Refer attached report for dipole validation kit data.

5. Prove calibration data

The probe ET3DV5 (SN: 1303) calibrated on February 1,2000 is used.

Refer attached report for calibration data.

6. Attached files

Plot data of SAR is attached as below.

SAR	Brain SAR			Body worn SAR		
Model	EB-TX210		EB-TX220	EB-TX210		EB-TX220
Battery type	Standard	Extended	Standard	Standard	Extended	Standard
AMPS	Brain_AMPS.pdf			Muscle_AMPS.pdf		
800MHzTDMA	Brain_TDMA.pdf			Muscle_TDMA.pdf		
PCS	Brain_PCS.pdf			Muscle_PCS.pdf		

Table7: SAR plot data files

Plot of system validation data and prove calibration data are also attached as below.

900MHz System validation	Validation.pdf
1800MHz System validation	Validation.pdf
900MHz dipole antenna calibration	D900.pdf
1800MHz dipole antenna calibration	D1800.pdf
Probe calibration	Probe.pdf

7. Picture of a soft holster and a leather carry case

Figs.4 through 7 are pictures of soft holster and leather carry case that are used for body worn SAR measurement.

Fig.4 Soft holster for EB-TX220

Fig.5 Soft holster for EB-TX220

Fig.6 leather carry case for EB-TX210

Fig.7 Leather carry case for EB-TX210

8. Table of power output on radiation test

Table below shows the conducted power output level measured at SAR measurement and radiation test, and ERP/EIRP at radiation test. For ERP/EIRP, power output level with and without private handsfree headset is indicated. Also, as a reference, all data except at SAR measurement, are indicated by 2 units (‘W’ and ‘dBm’).

On the previous radiation test report from JQA, EIRP of PCS for EX-TX220 was much lower than for EB-TX210. Therefore, those data including conducted power output had re-measured.

Power level variation shown in the table below is due to difference of measurement method, measurement error and power level adjustment error.

Especially, both EB-TX210 and EB-TX220 support the temperature compensation of power level function. Therefore, +/-1dB variation of power level is permissible error.

Also, power output is usually adjusted to achieve +/-0.5dB error against the target value. However, power output was adjusted as shown in the table only before SAR measurement.

On the other hand, installing private handsfree headset influences to ERP for AMPS and TDMA more than EIRP for PCS. The reason is the difference of antenna system. It means that for AMPS and TDMA, high frequency current flows much on PCB than for PCS. Therefore table below is reasonable result.

EB-TX210A

ch	Conduted Power(dBm)		ERP(dBm)		With Private H/F ERP(dBm)	
	SAR	Rad. Test *	hor.	ver.	hor.	ver.
L	25.00	25.80	22.10	24.20	22.60	22.70
M	25.00	26.10	25.60	25.20	22.60	24.20
H	25.00	25.90	19.59	24.20	20.61	22.20

Conduted Power(W)	ERP(W)		With Private H/F ERP(W)	
Rad. Test *	hor.	ver.	hor.	ver.
0.380	0.162	0.263	0.182	0.186
0.407	0.363	0.331	0.182	0.263
0.389	0.091	0.263	0.115	0.166

EB-TX220A

ch	Conduted Power(dBm)		ERP(dBm)		With Private H/F ERP(dBm)	
	SAR	Rad. Test *	hor.	ver.	hor.	ver.
L	25.00	25.80	22.10	22.70	17.63	21.21
M	25.00	26.10	21.11	23.69	20.61	22.70
H	25.00	26.00	22.10	20.21	21.11	18.20

Conduted Power(W)	ERP(W)		With Private H/F ERP(W)	
Rad. Test *	hor.	ver.	hor.	ver.
0.380	0.162	0.186	0.058	0.132
0.407	0.129	0.234	0.115	0.186
0.398	0.162	0.105	0.129	0.066

TDMA

EB-TX210A

ch	Conduted Power(dBm)		ERP(dBm)		With Private H/F ERP(dBm)	
	SAR	Rad. Test *	hor.	ver.	hor.	ver.
L	26.80	30.20	28.10	30.20	28.60	28.70
M	26.80	30.40	31.60	31.20	28.60	30.20
H	26.80	29.50	25.60	30.20	26.60	28.20

Conduted Power(W)	ERP(W)		With Private H/F ERP(W)	
Rad. Test *	hor.	ver.	hor.	ver.
1.047	0.646	1.047	0.724	0.741
1.096	1.445	1.318	0.724	1.047
0.891	0.363	1.047	0.457	0.661

EB-TX220A

ch	Conduted Power(dBm)		ERP(dBm)		With Private H/F ERP(dBm)	
	SAR	Rad. Test *	hor.	ver.	hor.	ver.
L	26.80	29.90	28.10	28.70	23.60	27.20
M	26.80	30.10	27.10	29.70	26.60	28.70
H	26.80	29.60	28.10	26.20	27.10	24.20

Conduted Power(W)	ERP(W)		With Private H/F ERP(W)	
Rad. Test *	hor.	ver.	hor.	ver.
0.977	0.646	0.741	0.229	0.525
1.023	0.513	0.933	0.457	0.741
0.912	0.646	0.417	0.513	0.263

PCS

EB-TX210A

ch	Conduted Power(dBm)		EIRP(dBm)		With Private H/F EIRP(dBm)	
	SAR	Rad. Test *	hor.	ver.	hor.	ver.
L	26.00	29.70	19.40	15.31	19.40	15.31
M	26.00	29.40	20.25	17.24	20.25	18.26
H	26.00	29.20	21.27	18.26	19.29	19.29

Conduted Power(W)	ERP(W)		With Private H/F ERP(W)	
Rad. Test *	hor.	ver.	hor.	ver.
0.933	0.087	0.034	0.087	0.034
0.871	0.106	0.053	0.106	0.067
0.832	0.134	0.067	0.085	0.085

EB-TX220A

ch	Conduted Power(dBm)		EIRP(dBm)		With Private H/F EIRP(dBm)	
	SAR	Rad. Test *	hor.	ver.	hor.	ver.
L	26.00	29.30	20.37	16.33	20.37	18.39
M	26.00	29.20	20.25	18.26	20.25	19.29
H	26.00	29.10	21.27	18.26	20.25	19.29

Conduted Power(W)	ERP(W)		With Private H/F ERP(W)	
Rad. Test *	hor.	ver.	hor.	ver.
0.851	0.109	0.043	0.109	0.069
0.832	0.106	0.067	0.106	0.085
0.813	0.134	0.067	0.106	0.085

* This measurement was based on the FCC specification of § 2.1046(a).

9. Variation of the thickness of batteries

As shown in section 2.1, distance from antenna to the bottom of the phantom is at least 14mm. On the other hand, production spec of thickness variation for both standard and extended batteries is +/-0.5mm. So, thickness variation can be ignored for SAR measurement.

10. Identification of soft holster and leather carry case in the manual

Inside the manual (accessory section), soft holster and leather carry case are identified as attached file (identification of carry case.pdf).