SAR TEST REPORT

Test Report No. : 31CE0283-HO-01-C

Applicant	:	**FUJIFILM Corporation**
Type of Equipment	:	**D-EVO G35i**
Model No.	:	**DR-ID 601SE** **(with wireless LAN module: 11a,11n(20HT),11n(40HT), MIMO 3×3)**
Test Standard	:	**FCC 47CFR §2.1093,** **Supplement C (Edition 01-01) to OET Bulletin 65**
Test Result	:	**Complied**
Maximum SAR(1g) Value	:	**0.085 W/kg** (at Antenna-top, IEEE 802.11a, 6Mbps(BPSK/OFDM), 5180MHz) **0.052 W/kg** (at Antenna-side-top, IEEE 802.11a, 6Mbps(BPSK/OFDM), 5180MHz) **0.032 W/kg** (at Antenna-side-bottom, IEEE 802.11a, 6Mbps(BPSK/OFDM), 5180MHz)

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above standards.
4. The test results in this test report are traceable to the national or international standards.

Date of test: November 30, December 1 and 2, 2010

Test engineer:
Hiroshi Naka
Engineer of EMC Service

Approved by:
Toyokazu Imamura
Leader of EMC Service

CONTENTS **PAGE**

Contents of appendixes

SECTION 1: Customer information

Company Name	FUJIFILM Corporation
Brand Name	FUJIFILM
Address	798 Miyanodai, Kaisei-machi, Ashigarakami-gun, Kanagawa 258-8538, Japan
Telephone Number	81-465-85-4054
Facsimile Number	81-465-85-2043
Contact Person	Hiroshi Ikarashi

SECTION 2: Equipment under test (E.U.T.)

2.1 Identification of EUT

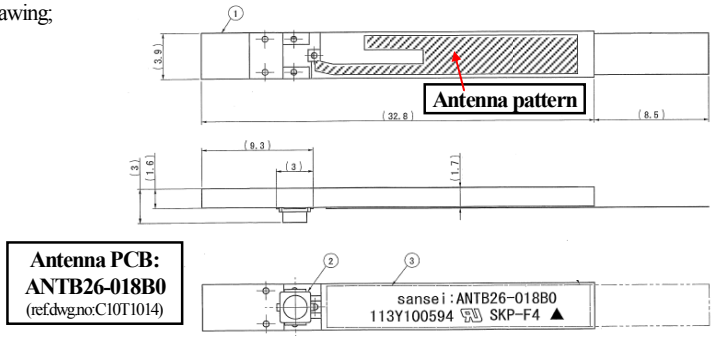
Type of Equipment (EUT)	D-EVO G35i *.This EUT is an X-ray imaging system with wireless LAN (11a, 11n(20HT), 11n(40HT))specification.
Model Number (EUT)	DR-ID 601SE
Serial Number	A121013
Condition of EUT	Production prototype
Receipt Date of Sample	November 29, 2010
Country of Mass-production	Japan
Category Identified	Portable device
Test consideration	DC 12V operation. *. This dc power is supplied from either the battery or bus-power connected with the MP. DR-ID 601SE had the battery. However, during SAR test, DR-ID 601SE was operated bus-power supplied from the MP. Because the continuous transmit was stopped automatically about 20 minutes when it was the battery operation.

2.2 Product Description

Equipment type	Transceiver
Frequency of operation	5180-5240MHz (W52 band, UNII), (5190-5230MHz for IEEE 802.11n(40HT))
Clock Frequency	40MHz (Method of frequency generation: Crystal)
Bandwidth / Channel spacing	Bandwidth: 20MHz (11a,11n(20HT)), 40MHz (11n(40HT) / Channel spacing: 20MHz (11a, 11n(20HT)), 40MHz (11n(40HT)
ITU code	D1D
Type of modulation	OFDM (BPSK, QPSK, 16QAM, 64QAM)
Antenna model	ANTB26-018B0
Antenna quantity	3 pcs. (Location: Top, Side-top, Side-bottom) (see attached the drawing) All three antenna model are same. The different is the mounted location and the RF cable length b/w antenna and RF module. IEEE 802.11a: Only the specified antenna transmits independently. EEE.802.11n: Specified two antennas, or all three antennas (diversity) can transmit simultaneously, however up to 2 streams are supported when tree antennas are transmitted. For the pre-selected multiple antenna transmission, only two antennas combination are supported either top and side-top antenna or top and side-bottom antenna.
Antenna type	Planer inverted F antenna
Antenna connector type	RF PCB side: U.FL, Antenna side: U.FL, connected by RF cable with specified length.
Antenna gain	-3.5 dBi (5.2GHz) For the reference, antenna gain (including the RF cable loss) when there were mounted in the host device and specified location. Antenna-top: -8.5dBi / Antenna-side-top: -7.3dBi / Antenna-side-bottom: -10.2dBi
Transmit power	13 dBm average (11a), 14.7 dBm average in maximum (11n, when Tx ×3 sum total, 10 dBm for each antenna port) *Refer to section 6 in this report.
Power supply	Power input: DC3.3V (*.with constant voltage circuit.), Inner operation: DC1.2V and DC1.8V
Operation temperature range	+5 to +35 deg.C. (for DR-ID601SE)

*. The EUT do not use the special transmitting technique such as "beam-forming" and "time-space code diversity."

*. Antenna outline drawing;



SECTION 3: Test specification, procedures and results

3.1 Requirements for compliance testing defined by the FCC / Test specification

The US Federal Communications Commission has released the report and order "Guidelines for Evaluating the Environmental Effects of RF Radiation", ET Docket No. 93-62 in August 1996. The order requires routine SAR evaluation prior to equipment authorization of portable transmitter devices, including portable telephones. For consumer products, the applicable limit is 1.6 mW/g for an uncontrolled environment and 8.0 mW/g for an occupational/controlled environment as recommended by the ANSI/IEEE standard C95.1-1992. According to the Supplement C of OET Bulletin 65 "Evaluating Compliance with FCC Guide-lines for Human Exposure to Radio frequency Electromagnetic Fields", released on Jun 29, 2001 by the FCC, the device should be evaluated at maximum output power (radiated from the antenna) under "worst-case" conditions for normal or intended use, incorporating normal antenna operating positions, device peak performance frequencies and positions for maximum RF energy coupling.

1. Specific Absorption Rate (SAR) is a measure of the rate of energy absorption due to exposure to an RF transmitting source (wireless portable device).
2. IEEE/ANSI Std. C95.1-1992 limits are used to determine compliance with FCC ET Docket 93-62.

Supplement C (Edition 01-01) to OET Bulletin 65 (Edition 97-01):

Supplement C (Edition 01-01) - Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions

OET Bulletin 65 (Edition 97-01) - Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields

IEEE Std 1528-2003:

IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques Supplement C

In additions;

KDB 447498 D01(v04)(Nov.13, 2009): Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies
KDB 248227 (rev.1.2)(May 29, 2007): SAR Measurement Procedures for 802.11a//b/g Transmitters

3.2 Exposure limit

(A) Limits for Occupational/Controlled Exposure (W/kg)

Whole-Body (averaged over the entire body)	Partial-Body (averaged over any 1g of tissue)	Hands, Wrists, Feet and Ankles (averaged over any 10g of tissue)
0.4	8.0	20.0

(B) Limits for General population/Uncontrolled Exposure (W/kg)

Whole-Body (averaged over the entire body)	Partial-Body (averaged over any 1g of tissue)	Hands, Wrists, Feet and Ankles (averaged over any 10g of tissue)
0.08	**1.6**	4.0

Occupational/Controlled Environments: are defined as locations where there is exposure that may be incurred by people who are aware of the potential for exposure, (i.e. as a result of employment or occupation).
General Population/Uncontrolled Environments: are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure.

The limit applied in this test report is;

General population / Uncontrolled exposure, Partial-Body (averaged over any 1g of tissue) limit: 1.6 W/kg

3.3 Procedures and Results

Item	Test Procedure	Limit	Exclusion	Remarks	Result
Human exposure	FCC OET Bulletin 65, Supplement C	1.6 W/kg (FCC 47CFR §2.1093)	(*1)	SAR measurement (in accordance with KDB248227)	**Complied** (*2) **Maximum SAR(1g):** **0.085 W/kg** (at antenna-top, IEEE 802.11a, 6Mbps, 5180MHz) **0.052 W/kg** (at antenna-side-top, IEEE 802.11a, 6Mbps, 5180MHz) **0.032 W/kg** (at antenna-side-bottom, IEEE 802.11a, 6Mbps, 5180MHz)

Note: UL Japan's SAR Work Procedures No.QPM46 and QPM47. Other than above, no addition, deviation nor exclusion has been made from standards.
*1. Refer to the FCC inquiry number: 265500 of the test procedure for SAR.
*2. For the multi antenna transmitting simultaneously (MIMO), the measured SAR(1g) values of each antenna were not summed, because the antenna separation of each antenna was more than 5cm. Refer to the FCC inquiry number: 265500 of the test procedure for SAR.

3.4 Test Location

No.7 shielded room (2.76(Width) × 3.76m(Depth) × 2.4m(Height)) for SAR testing.

UL Japan, Inc., Shonan EMC Lab.
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken 259-1220 JAPAN
Telephone number: +81 463 50 6400 / Facsimile number: +81 463 50 6401

3.5 Confirmation before SAR testing

3.5.1 Correlation of Output Power between EMC and SAR tests

It was checked that the antenna port power was correlated within 0~+5% (FCC requirements)
The result is shown in Section 6.

*. **Output power at SAR test:** SAR power was measured before SAR testing (S/N: A121013).
11a, 11n(20HT) and 11n(40HT) mode was measured the average output power at full channel.

*. **Output power at EMC test:** EMC power was measured during EMC testing. (S/N: A121014).
The average output power of 11a, 11n(20HT) at 5180MHz and 11n(40HT) at 5190 MHz which were obtained the worst average power in SAR test sample, was measured on the EMC test sample by using the power sensor/meter method as a cross-reference data for SAR test.

3.5.2 Average power for SAR tests

Step.1 Data rate check

The data rate check was measurement all data rate in the lower default frequency of each frequency band. (*1)

*1. 5180MHz (11a, 11n(20HT)), 5190MHz (11n(40HT))

11a		11n			11n		
Modulation	Data rate [Mbps]	MCS Index	Spatial Stream	Modulation	MCS Index	Spatial Stream	Modulation
BPSK/OFDM	6	MCS0	1	BPSK/OFDM	MCS0	1	BPSK/OFDM
BPSK/OFDM	9	MCS1	1	QPSK/OFDM	MCS1	1	QPSK/OFDM
QPSK/OFDM	12	MCS2	1	QPSK/OFDM	MCS2	1	QPSK/OFDM
QPSK/OFDM	18	MCS3	1	16QAM/OFDM	MCS3	1	16QAM/OFDM
16QAM/OFDM	24	MCS4	1	16QAM/OFDM	MCS4	1	16QAM/OFDM
16QAM/OFDM	36	MCS5	1	64QAM/OFDM	MCS5	1	64QAM/OFDM
64QAM/OFDM	48	MCS6	1	64QAM/OFDM	MCS6	1	64QAM/OFDM
64QAM/OFDM	54	MCS7	1	64QAM/OFDM	MCS7	1	64QAM/OFDM
		MCS8	2	BPSK/OFDM	MCS8	2	BPSK/OFDM
		MCS9	2	QPSK/OFDM	MCS9	2	QPSK/OFDM
		MCS10	2	QPSK/OFDM	MCS10	2	QPSK/OFDM
		MCS11	2	16QAM/OFDM	MCS11	2	16QAM/OFDM
		MCS12	2	16QAM/OFDM	MCS12	2	16QAM/OFDM
		MCS13	2	64QAM/OFDM	MCS13	2	64QAM/OFDM
		MCS14	2	64QAM/OFDM	MCS14	2	64QAM/OFDM
		MCS15	2	64QAM/OFDM	MCS15	2	64QAM/OFDM

Step.2 Decision of SAR test channel

The average output power for 802.11a, 11n(20HT), 11n(40Ht) were measured on all channels in each frequency band.

Mode		GHz	Channel	Turbo Channel	"Default Test Channel"			
					FCC 15.247		UNII	
					802.11b	802.11g		
802.11 b/g		2.412	1		√	Δ		
		2.437	6	6	√	Δ		
		2.462	11		√	Δ		
802.11a	UNII	5.18	36	42(5.21 GHz)			√	
		5.20	40					*
		5.22	44					*
		5.24	48				√	
		5.26	52	50(5.25 GHz)			√	
		5.28	56	58(5.29 GHz)				*
		5.30	60					*
		5.32	64				√	
		5.50	100	Unknown				*
		5.52	104				√	
		5.54	108					*
		5.56	112					*
		5.58	116				√	
		5.60	120					*
		5.62	124				√	
		5.64	128					*
		5.66	132					*
		5.68	136				√	
		5.70	140					*
	UNII or FCC 15.247	5.745	149		√		√	
		5.765	153	152(5.76 GHz)		*		*
		5.785	157		√			*
		5.805	161	160(5.80GHz)		*	√	
	FCC 15.247	5.825	165		√			

√ = "default test channels"
* = Possible 802.11a channels with maximum average output > the "default test channels"
Δ = Possible 802.11g channels with maximum average output ¼ dB ≥ the "default test channels"

3.6 Confirmation after SAR testing

It was checked that the power drift [W] is within ±5% in the evaluation procedure of SAR testing. The verification of power drift during the SAR test is that DASY4 system calculates the power drift by measuring the e-filed at the same location at beginning and the end of the scan measurement for each test position.
The result is shown in APPENDIX 2.

*. DASY4 system calculation Power drift value[dB] =20log(Ea)/(Eb) (where, Before SAR testing: Eb[V/m] / After SAR testing: Ea[V/m])

Limit of power drift[W] = ±5%
Power drift limit (X) [dB] = 10log(P_drift)=10log(1.05/1)=10log(1.05)-10log(1)=0.212dB
from E-filed relations with power.
S=E×H=E^2/η=P/(4×π×r^2) (η: Space impedance) → P=(E^2×4×π×r^2)/η
Therefore, The correlation of power and the E-filed
Power drift limit (X) dB=10log(P_drift)=10log(E_drift)^2=20log(E_drift)
From the above mentioned, the calculated power drift of DASY4 system must be the less than ±0.212dB.

3.7 Measurement procedure

Operation mode: **IEEE 802.11a, IEEE 802.11n(20HT), IEEE 802.11n(40HT)**

Radiated power is always monitored by Spectrum Analyzer.
At the start, the SAR was measured on each 11a/11n(20HT)/11n(40HT) mode that had the highest average power for the antenna port conducted power measurement.

Step 1	The searching for the worst position. (at highest average power data rate and channel.)
Step 2	Change the transmitting mode at worst position.
Step 3	Change to the Low and High channels at worst position and at worst mode only when the measured SAR(1g) was higher than 0.8W/kg.
Step 4	Change to the Tx antenna and repeat above step 1 ~3.

3.8 Test setup of EUT

Top-touch	The part of top surface which was near section of the antenna-top was touched to the flat section of Flat phantom.
Right-touch	Either the part of top surface which was near section of either antenna-side-top or antenna side-bottom was touched to the flat section of Flat phantom.
Front-touch	The part of front surface (patient side) was touched to the flat section of Flat phantom for either near section of the antenna-top, antenna-side-top nor antenna-side-bottom.
Rear-touch	The part of rear surface (operator side) was touched to the flat section of Flat phantom for either near section of the antenna-top, antenna-side-top nor antenna-side-bottom.
Bottom-touch	The test was not applied. Because the measured SAR values were very small even the cross section of antenna, and this side had enough separation distance from each antenna. (*1)
Left-touch	The test was not applied. Because the measured SAR values were very small even the cross section of antenna, and this side had enough separation distance from each antenna. (*1)

*1. Refer to the FCC inquiry number: 265500 of the test procedure for SAR.

SECTION 4: Operation of E.U.T. during testing

4.1 Operating modes for SAR testing

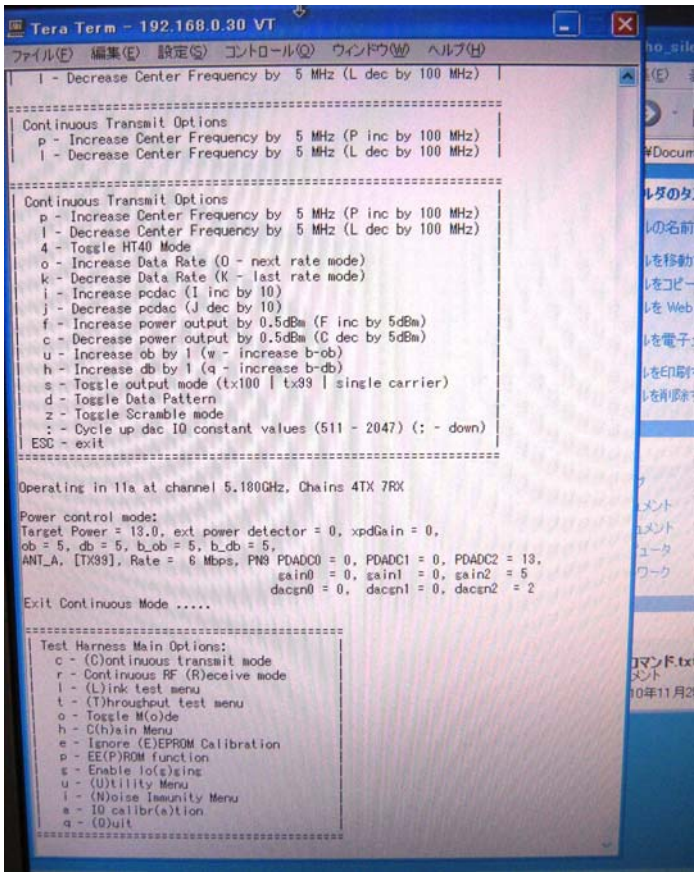
This EUT has IEEE.802.11a/11n(20HT)/11n(40HT) continuous transmitting modes.
The frequency band and the modulation used in the SAR testing are shown as a following.

Operation mode	IEEE 802.11a	IEEE 802.11n(20Ht)	IEEE 802.11n(40HT)
Tx frequency band	5180-5240MHz	5180-5240MHz	5190-5230MHz
Tested channel	36ch (5180MHz) (*1)	36ch (5180MHz) (*1)	not applied (*2)
Modulation	BPSK/OFDM	BPSK/OFDM	not applied (*2)
Data rate	6Mbps (lower, worst average power of antenna terminal conducted)	MCS0 (lower, worst average power of antenna terminal conducted)	not applied (*2)
Tested antenna	Top, Side-top, Side-bottom independently	Top, Side-top, Side-bottom independently	not applied (*2)
Crest factor	1.0 (100% duty cycle)	1.0 (100% duty cycle)	not applied (*2)
Controlled software	Tera Term-192.168.0.30_VT During SAR test, the EUT was connected with the MP (Main Processor) via SE cable. The MP was set the transmit condition and also supplied dc power via SE cable. The software made set transmission antenna, q'ty, data rate, frequency. The transmit power was made pre-set by the internal calibration data before the test. antenna ID for test; 11a: single transmission antenna either top, side-top or side-bottom. 11n(20HT): multi transmission antenna.		

*1. The SAR tested channel was lowest default channel that had highest average antenna power alone. Because the measured SAR(1g) with this lowest default channel was less than 0.8W/kg. In accordance with KDB 447498, 1), e), i), the SAR test was only performed lowest default channel that had highest average antenna power alone.
Refer to the FCC inquiry number: 265500 of the test procedure for SAR.

*2. The SAR test for IEEE 802.11n(40HT) was not applied. Because the measured SAR of IEEE 802.11n(20HT) was very small (<0.1W/kg) and enough smaller than the corresponded IEEE .802.11a SAR data.
Refer to the FCC inquiry number: 265500 of the test procedure for SAR.

*. The photograph shows the example for the control software used. (single Tx of antenna-side-top, 11a, 6Mbps, 5180MHz, after calibration (=13dBm RF out))



SECTION 5: Uncertainty Assessment (SAR measurement)

Uncertainty of SAR measurement system	5~6 GHz	
	1g SAR	10g SAR
combined measurement uncertainty of the measurement system (k=1)	**± 13.6%**	± 13.3%
expanded uncertainty (k=2)	**± 27.2%**	± 26.7%

	Error Description	Uncertainty Value	Probability distribution	Divisor	ci (1g)	ci (10g)	ui (1g)	ui (10g)	vi, veff
A	**Measurement System**						(std.uncertainty)	(std.uncertainty)	
1	Probe calibration	±6.8 %	Normal	1	1	1	±6.8 %	±6.8 %	∞
2	Axial isotropy	±4.7 %	Rectangular	√3	0.7	0.7	±1.9 %	±1.9 %	∞
3	Hemispherical isotropy (*flat phantom, <5°)	±2.6 %	Rectangular	√3	0.7	0.7	±1.1 %	±1.1 %	∞
4	Boundary effects	±2.0 %	Rectangular	√3	1	1	±1.2 %	±1.2 %	∞
5	Probe linearity	±4.7 %	Rectangular	√3	1	1	±2.7 %	±2.7 %	∞
6	System detection limit	±1.0 %	Rectangular	√3	1	1	±0.6 %	±0.6 %	∞
7	System readout electronics	±0.3 %	Normal	1	1	1	±0.3 %	±0.3 %	∞
8	Response time	±0.8 %	Rectangular	√3	1	1	±0.5 %	±0.5 %	∞
9	Integration time	±2.6 %	Rectangular	√3	1	1	±1.5 %	±1.5 %	∞
10	RF ambient - noise	±3.0 %	Rectangular	√3	1	1	±1.7 %	±1.7 %	∞
11	RF ambient - reflections	±3.0 %	Rectangular	√3	1	1	±1.7 %	±1.7 %	∞
12	Probe positioner mechanical tolerance	±0.8 %	Rectangular	√3	1	1	±0.5 %	±0.5 %	∞
13	Probe positioning with respect to phantom shell	±9.9 %	Rectangular	√3	1	1	±5.7 %	±5.7 %	∞
14	Max.SAR evaluation	±4.0 %	Rectangular	√3	1	1	±2.3 %	±2.3 %	∞
B	**Test Sample Related**								
15	Device positioning	±5.0 %	Normal	1	1	1	±5.0 %	±5.0 %	∞
16	Device holder uncertainty	±5.0 %	Normal	1	1	1	±5.0 %	±5.0 %	∞
17	Power drift	±5.0 %	Rectangular	√3	1	1	±5.0 %	±2.9 %	∞
C	**Phantom and Setup**								
18	Phantom uncertainty	±4.0 %	Rectangular	√3	1	1	±2.3 %	±2.3 %	∞
19	Liquid conductivity (target)	±5.0 %	Rectangular	√3	0.64	0.43	±1.8 %	±1.2 %	∞
20	Liquid conductivity (meas.)	±3.0 %	Normal	1	0.64	0.43	±1.9 %	±1.3 %	∞
21	Liquid permittivity (target)	±5.0 %	Rectangular	√3	0.6	0.49	±1.7 %	±1.4 %	∞
22	Liquid permittivity (meas.)	±3.2 %	Normal	1	0.6	0.49	±1.9 %	±1.6 %	∞
	Combined Standard Uncertainty						**±13.6** %	**±13.3** %	∞
	Expanded Uncertainty (k=2)						**±27.2** %	**±26.7** %	

*. This measurement uncertainty budget is suggested by Schmid & Partner Engineering AG. [6]

SECTION 6: Confirmation before testing

6.1 Assessment for the conducted power of EUT

Power for SAR (data rate, channel determination) and Correlation of Output Power b/w EMC and SAR tests

【Antenna terminal conducted power】

Mode: IEEE 802.11a *target=13dBm/after calibration command

1)EMC vs SAR power | Single Tx, ant#3:top/ant#2:side-bottom/ant#1:side-top | sn:A121013 | sn:A121014

Ch.	Freq. [MHz]	Data Rate	Ant. No.	type	Modulation	P/M Reading Ave.[dBm]	P/M Reading Pk[dB]	Cable Loss [dB]	Attenuator [dB]	Results(SAR) Ave.[dBm]	Results(SAR) Ave.[mW]	Results(EMC) Ave.[dBm]	Results(EMC) Ave.[mW]	⊿SAR-EMC[dBm]
36	5180	6	1	emc	BPSK OFDM	0.08	9.75	1.37	10.00			11.45	13.98	ref.ant#1
36	5180	6	2	emc	BPSK OFDM	0.09	9.40	1.37	10.00			11.46	14.01	ref.ant#2
36	5180	6	3	emc	BPSK OFDM	0.53	9.32	1.37	10.00			11.90	15.51	ref.ant#3
36	5180	6	1	sar	BPSK OFDM	0.19	9.51	1.37	10.01	11.57	14.37	-(1 *1)	-(1 *1)	**0.12**
36	5180	6	2	sar	BPSK OFDM	0.19	9.51	1.37	10.01	11.57	14.37			**0.11**
36	5180	6	3	sar	BPSK OFDM	0.58	9.39	1.37	10.01	11.96	15.72			**0.06**

2)SAR power (vs. data rate) (at highest average power channel) | sn:A121013

Ch.	Freq. [MHz]	Data Rate	Ant. No.	Worst	Modulation	P/M Reading Ave.[dBm]	P/M Reading Pk[dB]	Cable Loss [dB]	Attenuator [dB]	Results (SAR) SAR-pre[dBm]	Results (SAR) SAR-pre[mW]	PAR [dB]
36	5180	6	3	worst	BPSK OFDM	0.58	9.39	1.37	10.01	**11.96**	15.72	8.81
36	5180	9	3		QPSK OFDM	0.48	9.52	1.37	10.01	11.86	15.36	9.04
36	5180	12	3		QPSK OFDM	0.47	9.58	1.37	10.01	11.85	15.33	9.11
36	5180	18	3		16QAM OFDM	0.43	9.34	1.37	10.01	11.81	15.19	8.91
36	5180	24	3		16QAM OFDM	0.38	9.35	1.37	10.01	11.76	15.01	8.97
36	5180	36	3		64QAM OFDM	0.34	9.29	1.37	10.01	11.72	14.88	8.95
36	5180	48	3		64QAM OFDM	0.33	9.51	1.37	10.01	11.71	14.84	9.18
36	5180	54	3		64QAM OFDM	0.30	9.63	1.37	10.01	11.68	14.74	9.33

*PAR=Peak-Ave[dB]

3)SAR power (vs. channel) (at worst average power data rate) | sn:A121013

Ch.	Freq. [MHz]	Data Rate	Ant. No.	Test ch.?	Modulation	P/M Reading Ave.[dBm]	P/M Reading Pk[dB]	Cable Loss [dB]	Attenuator [dB]	Results Ave[dBm]	Results Ave[mW]	PAR [dB]	⊿def.[dBm] (vs.next.ch.)	default change?
36	5180	6	3	default	BPSK OFDM	0.58	9.39	1.37	10.01	**11.96**	15.72	8.81	**default**	->default worst
40	5200	6	3		BPSK OFDM	0.57	9.22	1.37	10.01	11.95	15.69	8.65	-0.01	x
44	5220	6	3		BPSK OFDM	0.50	9.67	1.37	10.01	11.88	15.43	9.17	0.19	x
48	5240	6	3	default	BPSK OFDM	0.31	9.42	1.37	10.01	11.69	14.77	9.11	**default**	->defalut
36	5180	6	2	default	BPSK OFDM	0.19	9.51	1.37	10.01	**11.57**	14.37	9.32	**default**	->default worst
40	5200	6	2		BPSK OFDM	-0.05	9.38	1.37	10.01	11.33	13.60	9.43	-0.24	x
44	5220	6	2		BPSK OFDM	-0.26	9.20	1.37	10.01	11.12	12.96	9.46	0.15	x
48	5240	6	2	default	BPSK OFDM	-0.41	8.84	1.37	10.01	10.97	12.52	9.25	**default**	->defalut
36	5180	6	1	default	BPSK OFDM	0.14	9.84	1.37	10.01	**11.52**	14.21	9.70	**default**	->default worst
40	5200	6	1		BPSK OFDM	-0.10	9.82	1.37	10.01	11.28	13.44	9.92	-0.24	x
44	5220	6	1		BPSK OFDM	0.09	9.72	1.37	10.01	11.47	14.04	9.63	-0.01	x
48	5240	6	1	default	BPSK OFDM	0.10	9.64	1.37	10.01	11.48	14.08	9.54	**default**	->defalut

*no off time(11a)->continuous Tx~dasy4 Crest.Factor=1.0

【Antenna terminal conducted power】

RF mode: IEEE 802.11n(20HT) *target=10dBm at each antenna port/after calibration command

1)EMC vs SAR power | Ant#1:side-top | Ant#2:side-bottom | Ant#3:top | sn:A121013 summed | sn:A121014 summed

Ch.	Freq. [MHz]	MCS Index	Ant. No.	Worst	Modulation	Ant#1.P/M Reading Ave.[dBm]	Ant#1.P/M Reading Pk[dB]	Ant#2.P/M Reading Ave.[dBm]	Ant#2.P/M Reading Pk[dB]	At#3.P/M Reading Ave.[dBm]	At#3.P/M Reading Pk[dB]	Cable Loss [dB]	Attenuator [dB]	Ant#1+#2+#3:Results(SAR) Ave.[dBm]	Ant#1+#2+#3:Results(SAR) Ave.[mW]	Ant#1+#2+#3:Results(EMC) Ave.[dBm]	Ant#1+#2+#3:Results(EMC) Ave.[mW]	⊿SAR-EMC[dBm]
36	5180	0	multi-Tx	emc	BPSK OFDM	-2.30	7.39	-2.98	6.55	-2.38	6.34	1.37	10.00			13.60	22.93	ref.
36	5180	0	multi-Tx	SAR	BPSK OFDM	-2.33	7.52	-2.96	6.65	-2.37	6.34	1.37	10.01	13.61	22.97	-(1 *1)	-(1 *1)	**0.01**

2)SAR power (vs. data rate) (at highest average power channel) | sn:A121013 summed

Ch.	Freq. [MHz]	MCS Index	Ant. No.	Worst	Modulation	Ant#1.P/M Reading Ave.[dBm]	Ant#1.P/M Reading Pk[dB]	Ant#2.P/M Reading Ave.[dBm]	Ant#2.P/M Reading Pk[dB]	At#3.P/M Reading Ave.[dBm]	At#3.P/M Reading Pk[dB]	Cable Loss [dB]	Attenuator [dB]	Ant#1+#2+#3:Results Ave.[dBm]	Ant#1+#2+#3:Results Ave.[mW]
36	5180	0	multi-Tx	worst	BPSK OFDM	-2.33	7.52	-2.96	6.65	-2.37	6.34	1.37	10.01	**13.61**	22.97
36	5180	1	multi-Tx		QPSK OFDM	-2.66	7.63	-3.17	6.56	-2.50	6.64	1.37	10.01	13.39	21.82
36	5180	2	multi-Tx		QPSK OFDM	-2.48	7.07	-3.24	6.92	-2.58	7.41	1.37	10.01	13.40	21.89
36	5180	3	multi-Tx		16QAM OFDM	-2.38	7.31	-3.35	6.72	-2.57	7.28	1.37	10.01	13.41	21.92
36	5180	4	multi-Tx		16QAM OFDM	-2.74	7.33	-3.37	6.90	-2.55	7.34	1.37	10.01	13.28	21.30
36	5180	5	multi-Tx		64QAM OFDM	-2.48	7.04	-3.45	6.70	-2.61	7.32	1.37	10.01	13.33	21.53
36	5180	6	multi-Tx		64QAM OFDM	-2.62	7.11	-3.42	6.82	-2.68	7.51	1.37	10.01	13.26	21.20
36	5180	7	multi-Tx		QPSK OFDM	-2.59	7.42	-3.36	7.18	-2.64	7.35	1.37	10.01	13.31	21.41
36	5180	8	multi-Tx		QPSK OFDM	-2.64	7.52	-3.35	6.88	-2.48	7.05	1.37	10.01	13.35	21.62
36	5180	9	multi-Tx		16QAM OFDM	-2.45	7.90	-3.26	6.95	-2.47	7.12	1.37	10.01	13.45	22.11
36	5180	10	multi-Tx		QPSK OFDM	-2.61	7.66	-3.38	6.58	-2.58	7.45	1.37	10.01	13.31	21.45
36	5180	11	multi-Tx		QPSK OFDM	-2.67	7.49	-3.32	6.49	-2.59	7.33	1.37	10.01	13.31	21.42
36	5180	12	multi-Tx		16QAM OFDM	-2.84	7.38	-3.46	7.02	-2.69	7.31	1.37	10.01	13.17	20.76
36	5180	13	multi-Tx		64QAM OFDM	-2.91	7.62	-3.64	6.95	-2.73	7.10	1.37	10.01	13.08	20.32
36	5180	14	multi-Tx		64QAM OFDM	-2.96	-7.65	-3.67	6.91	-2.72	7.27	1.37	10.01	13.06	20.22
36	5180	15	multi-Tx		64QAM OFDM	-3.01	8.12	-3.71	6.87	-2.77	7.02	1.37	10.01	13.01	20.00

3)SAR power (vs. channel) (at worst average power data rate) | sn:A121013 summed

Ch.	Freq. [MHz]	MCS Index	Ant. No.	Test ch.?	Modulation	Ant#1.P/M Reading Ave.[dBm]	Ant#1.P/M Reading Pk[dB]	Ant#2.P/M Reading Ave.[dBm]	Ant#2.P/M Reading Pk[dB]	At#3.P/M Reading Ave.[dBm]	At#3.P/M Reading Pk[dB]	Cable Loss [dB]	Attenuator [dB]	Ant#1+#2+#3:Results Ave.[dBm]	Ant#1+#2+#3:Results Ave.[mW]	⊿def.[dBm] (vs.next.ch.)	default change?
36	5180	0	multi-Tx	default	BPSK OFDM	-2.33	7.52	-2.96	6.65	-2.37	6.34	1.37	10.01	**13.61**	22.97	**default**	->default worst
40	5200	0	multi-Tx		BPSK OFDM	-2.56	7.43	-3.17	6.84	-3.47	6.23	1.37	10.01	13.11	20.45	0.00	x
44	5220	0	multi-Tx		BPSk OFDM	-2.63	7.24	-3.08	6.27	-3.20	6.29	1.37	10.01	13.19	20.86	0.00	x
48	5240	0	multi-Tx	default	BPSK OFDM	-2.97	6.97	-3.40	6.16	-3.22	6.13	1.37	10.01	12.96	19.78	**default**	->defalut

*no off time(11n(20HT))->continuous Tx~dasy4 Crest.Factor=1.0

*.Sample calculation: Results=(P/M Reading)+(Cable Loss)+(Attenuator)
*.Equipment used(SAR): KPM-08, KPSS-04, KCC-D23, KAT10-S3, STM-G2&SCC-H2, STM-G3&SCC-H1
*1.These number are the one of the reference only to compare both EUT and the RF power level with using same measurement method.
For the radio measurement, the different EUT (sn:A121014) was used.
Equipment used(radio): SPM-06, SPSS-03, KCC-D23, SAT10-06, STM-G2&SCC-H2, STM-G3&SCC-H1

Power for SAR (data rate, channel determination) and Correlation of Output Power b/w EMC and SAR tests (cont'd)

【Antenna terminal conducted power】

RF mode: IEEE 802.11n(40HT) *target=10dBm at each antenna port/after calibration command

1)EMC vs SAR power

Ch.	Freq. [MHz]	MCS Index	Ant. No.	Worst	Modulation		Ant#1 side-top Ant#1.P/M Reading Ave.[dBm]	Ant#1 side-top Ant#1.P/M Reading Pk[dB]	Ant#2 side-bottom Ant#2.P/M Reading Ave.[dBm]	Ant#2 side-bottom Ant#2.P/M Reading Pk[dB]	Ant#3 top At#3.P/M Reading Ave.[dBm]	Ant#3 top At#3.P/M Reading Pk[dB]	Cable Loss [dB]	Attenuator [dB]	sn:A121013 summed Ant#1+#2+#3:Results(SAR) Ave.[dBm]	sn:A121013 summed Ant#1+#2+#3:Results(SAR) Ave.[mW]	sn:A121014 summed Ant#1+#2+#3:Results(EMC) Ave.[dBm]	sn:A121014 summed Ant#1+#2+#3:Results(EMC) Ave.[mW]	⊿SAR-EMC[dBm]
38	5190	0	multi-Tx	emc	BPSK	OFDM	-2.36	10.20	-2.70	8.65	-2.71	8.65	1.37	10.00			13.56	22.69	ref.
38	5190	0	multi-Tx	SAR	BPSK	OFDM	-2.36	10.31	-2.61	8.69	-2.60	8.65	1.37	10.01	13.63	23.09	-(1*1)	-(1*1)	0.08

2)SAR power (vs. data rate) (at highest average power channel)

Ch.	Freq. [MHz]	MCS Index	Ant. No.	Worst	Modulation		Ant#1.P/M Reading Ave.[dBm]	Ant#1.P/M Reading Pk[dB]	Ant#2.P/M Reading Ave.[dBm]	Ant#2.P/M Reading Pk[dB]	At#3.P/M Reading Ave.[dBm]	At#3.P/M Reading Pk[dB]	Cable Loss [dB]	Attenuator [dB]	sn:A121013 summed Ant#1+#2+#3:Results Ave.[dBm]	sn:A121013 summed Ant#1+#2+#3:Results Ave.[mW]
38	5190	0	1&2&3	worst	BPSK	OFDM	-2.36	10.31	-2.61	8.69	-2.60	8.65	1.37	10.01	13.63	23.09
38	5190	1	1&2&3		QPSK	OFDM	-2.52	8.26	-2.87	7.64	-2.79	8.26	1.37	10.01	13.43	22.04
38	5190	2	1&2&3		QPSK	OFDM	-2.66	8.87	-2.87	7.55	-2.82	8.07	1.37	10.01	13.37	21.75
38	5190	3	1&2&3		16QAM	OFDM	-2.75	8.99	-2.98	7.82	-2.79	7.26	1.37	10.01	13.32	21.46
38	5190	4	1&2&3		16QAM	OFDM	-2.83	8.23	-3.09	7.52	-2.91	7.33	1.37	10.01	13.21	20.96
38	5190	5	1&2&3		64QAM	OFDM	-2.89	9.14	-3.14	8.13	-2.95	8.51	1.37	10.01	13.16	20.72
38	5190	6	1&2&3		64QAM	OFDM	-2.86	8.21	-3.17	7.27	-3.01	8.41	1.37	10.01	13.14	20.63
38	5190	7	1&2&3		QPSK	OFDM	-2.82	8.25	-3.17	7.33	-3.11	7.35	1.37	10.01	13.13	20.54
38	5190	8	1&2&3		QPSK	OFDM	-2.64	7.81	-2.87	7.56	-2.89	7.37	1.37	10.01	13.36	21.67
38	5190	9	1&2&3		16QAM	OFDM	-2.70	8.06	-2.98	7.98	-2.97	7.12	1.37	10.01	13.27	21.26
38	5190	10	1&2&3		QPSK	OFDM	-2.72	8.30	-3.15	7.14	-3.03	7.33	1.37	10.01	13.19	20.86
38	5190	11	1&2&3		QPSK	OFDM	-2.79	8.14	-3.10	7.50	-3.07	7.21	1.37	10.01	13.17	20.76
38	5190	12	1&2&3		16QAM	OFDM	-2.77	8.27	-3.19	7.74	-3.18	7.26	1.37	10.01	13.11	20.48
38	5190	13	1&2&3		64QAM	OFDM	-2.93	8.13	-3.21	7.52	-3.25	7.23	1.37	10.01	13.03	20.08
38	5190	14	1&2&3		64QAM	OFDM	-2.90	8.10	-3.24	7.35	-3.36	7.08	1.37	10.01	12.99	19.92
38	5190	15	1&2&3		64QAM	OFDM	-2.96	8.02	-3.26	7.42	-3.40	6.94	1.37	10.01	12.95	19.74

3)SAR power (vs. channel) (at worst average power data rate)

Ch.	Freq. [MHz]	MCS Index	Ant. No.	Test ch.?	Modulation		Ant#1.P/M Reading Ave.[dBm]	Ant#1.P/M Reading Pk[dB]	Ant#2.P/M Reading Ave.[dBm]	Ant#2.P/M Reading Pk[dB]	At#3.P/M Reading Ave.[dBm]	At#3.P/M Reading Pk[dB]	Cable Loss [dB]	Attenuator [dB]	sn:A121013 summed Ant#1+#2+#3:Results Ave.[dBm]	sn:A121013 summed Ant#1+#2+#3:Results Ave.[mW]	⊿def.[dBm] (vs.next.ch.)	default change?
38	5190	0	1&2&3	default	BPSK	OFDM	-2.36	10.31	-2.61	8.69	-2.60	8.65	1.37	10.01	13.63	23.09	default	->default worst
46	5230	0	1&2&3	default	BPSK	OFDM	-2.67	9.85	-2.98	8.27	-2.62	8.64	1.37	10.01	13.40	21.89	default	->default

*.no off time(11n(40HT+B146)->continuous Tx`dasy4 Crest.Factor=1.0

*.Sample calculation: Results=(P/M Reading)+(Cable Loss)+(Attenuator)
*.Equipment used(SAR): KPM-08, KPSS-04, KCC-D23, KAT10-S3, STM-G2&SCC-H2, STM-G3&SCC-H1
*1.These number are the one of the reference only to compare both EUT and the RF power level with using same measurement method.
For the radio measurement, the different EUT (sn:A121014) was used.
Equipment used(radio): SPM-06, SPSS-03, KCC-D23, SAT10-06, STM-G2&SCC-H2, STM-G3&SCC-H1

*. For the SAR reference (S/N:A12013); measured date: November29, 2010 / Measured by: Hiroshi Naka / Measured place: No. 5 shielded room. (24 deg.C. / 35 %)
*. For the EMC reference (S/N:A12014); measured date: November30, 2010 / Measured by: Tastuya Arai / Measured place: No. 6 shielded room. (24 deg.C. / 33 %)
The EMC test data was shown in the EMC test report: 31CE0283-HO-01-A.

SECTION 7: Measurement results

7.1 Body SAR

Measurement date : November 30, December 1 and 2, 2010
Measurement by : Hiroshi Naka

[Liquid measurement (body tissue)]

Used Target Frequency [MHz]	Target Head Tissue		Measured Head Tissue				Environment		Measured Date
	Permittivity [-]	Conductivity [S/m]	Permittivity (εr) [-]	Conductivity (σ) [S/m]	Temp. [deg.C.]	Depth [mm]	Temp. [deg.C.]	Humidity [%]	
5180	**49.0**	**5.28**	47.24 (-3.7%)	5.356 (+1.5%)	23.6	144	23.3	34	November 30, 2010, before SAR
5180	**49.0**	**5.28**	47.15 (-3.8%)	5.345 (+1.3%)	23.5	144	23.6	35	December 1, 2010, before SAR
5180	**49.0**	**5.28**	46.72 (-4.7%)	5.318 (+0.8%)	23.7	144	23.6	35	December 2, 2010, before SAR

*. The target value was linear interpolated from the number of 3000MHz and 5800MHz defined in OET Bulletin 65, Supplement C.

[SAR measurement results]

SAR measurement results											
Frequency			Modulation &Data rate [Mbps] / crest factor	EUT setup conditions			Liquid temp. [deg.C]		Power drift [dB]	SAR(1g) [W/kg]	Remarks
Mode	ch	[MHz]		Antenna no#	Position	Distance [mm]	Before	After		maximum value of multi-peak	
Antenna: Antenna_Top											
Step A1: Worst setup position search (at highest average antenna power data rate and channel)											
11a	36	5180	BPSK&OFDM / 6Mbps / 1.0	Top	**Top-touch**	0	22.6	22.6	-0.169	**0.085**	**->Worst for antenna-Top.**
	36	5180	BPSK&OFDM / 6Mbps / 1.0	Top	**Front-touch**	0	23.0	23.0	0.20	0.017	-
	36	5180	BPSK&OFDM / 6Mbps / 1.0	Top	**Rear-touch**	0	22.9	23.0	0.21	0.031	-
Step A2: Change the transmitting mode at worst position (IEEE 801.11n, at highest average antenna power data rate and channel)											
20HT	36	5180	BPSK&OFDM / MCS0 / 1.0	Top	**Top-touch**	0	22.6	22.6	0.166	0.043	Simultaneously multi Tx.
Antenna: Antenna_Side-top											
Step B1: Worst setup position search (at highest average antenna power data rate and channel)											
11a	36	5180	BPSK&OFDM / 6Mbps / 1.0	Side-top	**Right-touch**	0	22.9	22.9	-0.085	**0.052**	**->Worst for antenna-Side-top.**
	36	5180	BPSK&OFDM / 6Mbps / 1.0	Side-top	**Front-touch**	0	23.3	23.3	0.21	0.0063	-
	36	5180	BPSK&OFDM / 6Mbps / 1.0	Side top	**Rear-touch**	0	23.2	23.2	-0.20	0.034	-
Step B2: Change the transmitting mode at worst position (IEEE 801.11n, at highest average antenna power data rate and channel)											
20HT	36	5180	BPSK&OFDM / MCS0 / 1.0	Side-top	**Right-touch**	0	23.2	23.2	0.21	0.024	Simultaneously multi Tx.
Antenna: Antenna_Side-bottom											
Step C1: Worst setup position search (at highest average antenna power data rate and channel)											
11a	36	5180	BPSK&OFDM / 6Mbps / 1.0	Side bottom	**Right-touch**	0	22.7	22.8	-0.046	**0.032**	**->Worst for antenna-Side-**
	36	5180	BPSK&OFDM / 6Mbps / 1.0	Side bottom	**Front-touch**	0	23.0	23.0	-	Small (*1)	-
	36	5180	BPSK&OFDM / 6Mbps / 1.0	Side bottom	**Rear-touch**	0	23.0	23.0	-	Small (*1)	-
Step C2: Change the transmitting mode at worst position (IEEE 801.11n, at highest average antenna power data rate and channel)											
20HT	36	5180	BPSK&OFDM / MCS0 / 1.0	Side bottom	**Right-touch**	0	23.2	23.2	0.054	0.010	Simultaneously multi Tx.

Notes:

*1. The zoom scan was not applied. The SAR value measured in area scan was very small. Therefore, for the zoom scan procedure, the correct interpolation process could not be achieved, because the target transmission level was very small.

*. The SAR test was only applied to the lower channel (as default) that had highest average antenna power. Because the measured SAR(1g) with this channel was less than 0.1W/kg. In accordance with KDB 447498, 1), e), i),the measured SAR was less than 0.8W/kg and the frequency band was equal or smaller than 100MHz (this EUT had 60MHz frequency band), the SAR test was only performed lower default channel that had highest average antenna power.

The SAR test for IEEE 802.11n(40HT) was not applied. Because the measured SAR of IEEE 802.11n(20HT) was very small (<0.1W/kg) and enough smaller than the corresponded of IEEE .802.11a SAR data.

The test was not applied to the bottom and left surface of EUT. Because the measured SAR values were very small even the cross section of antenna, and these side had enough separation distance (longer than 5cm) from each antenna.

For the multi antenna transmitting simultaneously (MIMO), the measured SAR(1g) values of each antenna were not summed, because the antenna separation of each antenna was more than 5cm.

The head SAR by using the head simulated liquid was not applied, because the measured body SAR was enough small to the limit.

For the above mentions, refer to the FCC inquiry number: 265500 of the test procedure for SAR.