SAR EVALUATION REPORT

Test Report No.	**E146R-066**
Applicant	**Samsung Electronics Co., Ltd.**
	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-742, Korea
Model Name	**S4343-W (Alternative Model Name : FDX4343RPW)**
DUT Type	**Wireless X-ray Detector**
Application Type	**Certification**
FCC ID	**A3LWIDT30Q**
IC ID	**649E-WIDT30Q**
Date of Report	**June 20, 2014**
Date of Test	**May 27, 2014 ~ June 17, 2014**
Test Laboratory	**ONETECH**
	301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862, Korea
Procedures	**KDB 865664**
	IEEE 1528-2003
	ANSI/IEEE C95.1, C95.3
	FCC CFR §2.1093
	RSS-102 Issue 4
Max SAR(1g)	**1.399 W/kg**
Test Opinion	**Satisfied to FCC requirements**

Report Author	**Jungwook Kim**	_____	**June 20, 2014**
Test Engineer	**Youngyong Kim**	_____	**June 20, 2014**

This report details the results of the testing carried out on one sample, the results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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1. DUT INFORMATION

DUT Description	Wireless X-ray Detector
Model Name	S4343-W (Alternative Model Name : FDX4343RPW)
Serial Number	Identical Prototype
Mode of Operation	WLAN
TX Frequency Range	2412 MHz ~ 2462 MHz (802.11 b/g/n_HT20) 5180 MHz ~ 5240 MHz (802.11 a/n_HT20) 5190 MHz ~ 5230 MHz (802.11 n_HT40) 5260 MHz ~ 5320 MHz (802.11 a/n_HT20) 5270 MHz ~ 5310 MHz (802.11 n_HT40) 5500 MHz ~ 5700 MHz (802.11 a/n_HT20) 5510 MHz ~ 5670 MHz (802.11 n_HT40) 5745 MHz ~ 5825 MHz (802.11 a/n_HT20) 5755 MHz ~ 5795 MHz (802.11 n_HT40)
Maximum Average Conducted Power	18.36 dBm (802.11b ch6 1Mbps)
Body Worn Accessory	N/A
Antenna Type & Gain	Patch Antenna Ant0 2450 MHz : -6.96 dBi / 5200 MHz : -11.64 dBi 5300 MHz : -8.39 dBi / 5500 MHz : -10.53 dBi 5600 MHz : -16.44 dBi / 5700 MHz : -19.78 dBi 5800 MHz : -20.56 dBi Ant1 2450 MHz : -11.10 dBi / 5200 MHz : -14.04 dBi 5300 MHz : -12.92 dBi / 5500 MHz : -14.69 dBi 5600 MHz : -22.43 dBi / 5700 MHz : -22.74 dBi 5800 MHz : -21.26 dBi
Antenna Operation	2 Antenna transmit together
Battery	11.4 VDC / 3.4Ah

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2. INTRODUCTION

The FCC and Industry Canada have adopted the guidelines for evaluating the environmental effects of radio frequency (RF) radiation in ET Docket 93-62 on Aug. 6, 1996 and Health Canada Safety Code 6 to protect the public and workers from the potential hazards of RF emissions due to FCC-regulated portable devices.
The safety limits used for the environmental evaluation measurements are based on the criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate (SAR) in IEEE/ANSI C95.1-1992 Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz and Health Canada RF Exposure Guidelines Safety Code 6. The measurement procedure described in IEEE/ANSI C95.3-2002 Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave is used for guidance in measuring the Specific Absorption Rate (SAR) due to the RF radiation exposure from the Equipment Under Test (EUT). These criteria for SAR evaluation are similar to those recommended by the International Committee for Non-Ionizing Radiation Protection (ICNIRP) in Biological Effects and
Exposure Criteria for Radiofrequency Electromagnetic Fields," Report No. Vol 74. SAR is a measure of the rate of energy absorption due to exposure to an RF transmitting source. SAR values have been related to threshold levels for potential biological hazards.

2.1 SAR Definition

Specific Absorption Rate is defined as the time derivative (rate) of the incremental energy (dU) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dV) of a given density (ρ).

$$SAR = \frac{d}{dt}\left(\frac{dW}{dm}\right) = \frac{d}{dt}\left(\frac{dW}{\rho dV}\right)$$

SAR is expressed in units of watts per kilogram (W/kg). SAR can be related to the electric field at a point by

$$SAR = \frac{\sigma \mid E \mid^2}{\rho}$$

where:

σ = conductivity of the tissue (S/m)
ρ = mass density of the tissue (kg/m^3)
E = rms electric field strength (V/m)

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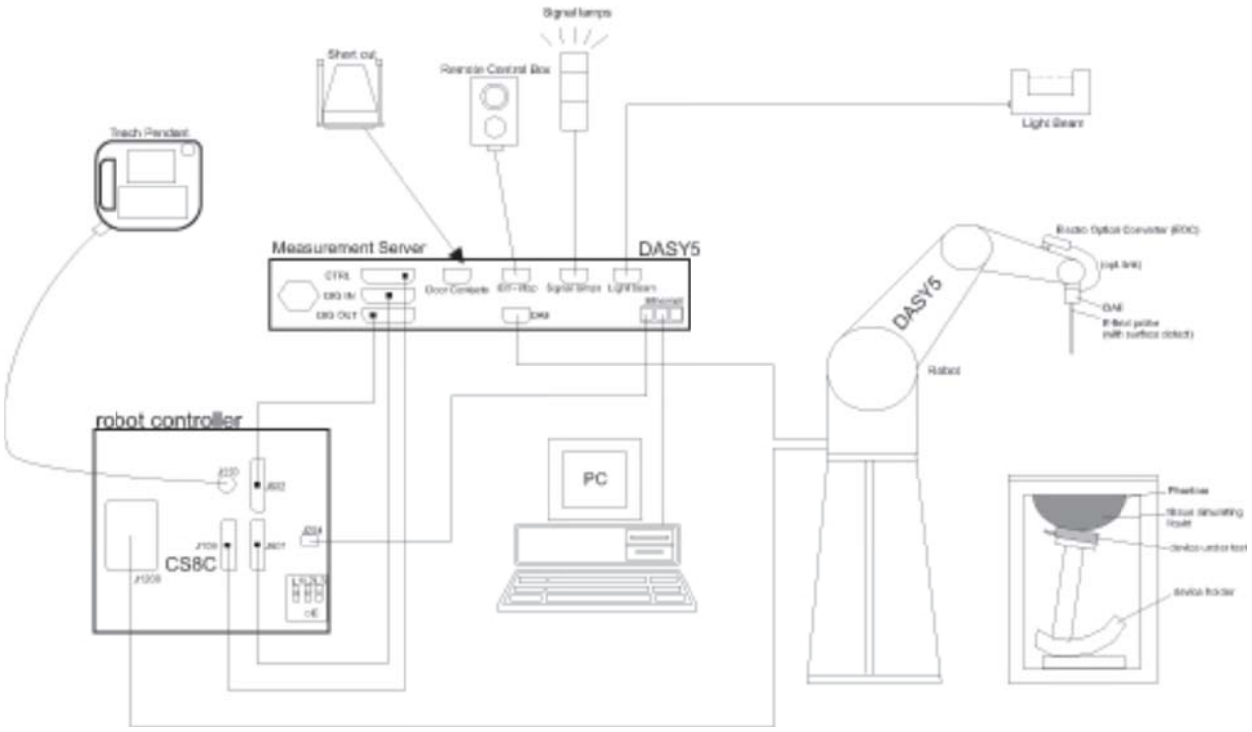
3. SAR MEASUREMENT SETUP

- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic Field probe optimized and calibrated for the targeted measurement.
- Data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing,
- AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running WinXP or Win7 and the DASY5 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.



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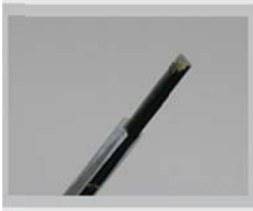
3.1 Dasy 5 system

DASY52 SAR	
	DASY52 SAR is a cost-effective package for demonstration of compliance of mobile phones with specific absorption rate (SAR) limits. The fastest and most accurate scanner on the market, it is fully compatible with all worldwide standards for transmitters operating at the ear or near the body (<200 mm from the skin).
Components (typical configuration)	1 **TX90XL** Stäubli Robot and Controller CS8c incl. Cabinet 1 **EOCx** Electro Optical Converter (mounted on robot arm) 1 Robot Stand for TX90XL 1 Robot Arm Extension and Adaptors 1 Robot Remote Control 1 **LB5** Light Beam Switch for Probe Tooling (incl. LB Adaptor) 1 Light Beam Mounting Plate 1 DASY5 Measurement Server 1 PC Intel Core 2 Dual / 3.16 GHz (or higher) incl. Color-Monitor 23" - 4 GB RAM, 220 GB HD (or larger) / Win7 1 **SAM Twin** Phantom V5.0 incl. Support DASY5 1 **MD4HHTV5** Mounting Device for Hand-Held Transmitters 1 **DAEx** Data Acquisition Electronics 1 **ES3DVx** SAR Probe (incl. ConvF for HSL at 900 and 1750 MHz)

3.2 E-Field Probe

EX3DV4 Smallest Isotropic E-Field Probe for Dosimetric Measurements (Preliminary Specifications)	
	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	ISO/IEC 17025 calibration service available.
Frequency	10 MHz to > 6 GHz Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Directivity	± 0.3 dB in TSL (rotation around probe axis) ± 0.5 dB in TSL (rotation normal to probe axis)
Dynamic Range	10 µW/g to > 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 µW/g)
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields); the only probe that enables compliance testing for frequencies up to 6 GHz with precision of better 30%.

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3.3 ELI Phantom

ELI	
	Phantom for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI is fully compatible with the IEC 62209-2 standard and all known tissue simulating liquids. ELI has been optimized regarding its performance and can be integrated into our standard phantom tables. A cover prevents evaporation of the liquid. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points. The phantom is compatible with all SPEAG dosimetric probes and dipoles. ELI V5.0 has the same shell geometry and is manufactured from the same material as ELI4, but has reinforced top structure.
Material	Vinylester, glass fiber reinforced (VE-GF)
Liquid Compatibility	Compatible with all SPEAG tissue simulating liquids (incl. DGBE type)
Shell Thickness	2.0 ± 0.2 mm (bottom plate)
Dimensions	Major axis: 600 mm Minor axis: 400 mm
Filling Volume	approx. 30 liters
Wooden Support	SPEAG standard phantom table

3.4 Mounting Device

Mounting Device for Laptops

MD4LAPV5 - Mounting Device for Laptops and other Body-Worn Transmitters

In combination with the Twin SAM V5.0/V5.0c or ELI Phantoms, the Mounting Device (Body-Worn) enables testing of ransmitter devices according to IEC 62209-2 specifications. The device holder can be locked for positioning at flat phantom section.

Material: Polyoxymethylene (POM), PET-G, Foam

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4. MEASUREMENT UNCERTAINTY

Uncertainty of SAR equipment for measurement Body 0.3 GHz to 3 GHz

No.		Error Description	Uncertainty Value (1 g) (%)	Uncertainty Value (10 g) (%)	Probe Dist.	Div.	C_i (1 g)	C_i (10 g)	$U_i(y)$ (1 g)	$U_i(y)$ (10 g)	V_i or V_{eff}
1	$U(PR_{cal})$	Probe Calibration	6.30	6.30	N	1.00	1.00	1.00	6.30	6.30	∞
2	$U(PR_{iso})$	Isotropy	1.87	1.87	R	$\sqrt{3}$	1.00	1.00	1.08	1.08	∞
3	$U(L)$	Linearity	0.60	0.60	R	$\sqrt{3}$	1.00	1.00	0.35	0.35	∞
4	$U(PR_{mod})$	Probe modulation response	2.40	2.40	R	$\sqrt{3}$	1.00	1.00	1.39	1.39	∞
6	$U(DL)$	Detection Limits	1.00	1.00	R	$\sqrt{3}$	1.00	1.00	0.58	0.58	∞
5	$U(BE)$	Boundary effect	1.00	1.00	R	$\sqrt{3}$	1.00	1.00	0.58	0.58	∞
7	$U(RE)$	Readout Electronics	0.30	0.30	N	1.00	1.00	1.00	0.30	0.30	∞
8	$U(T_{RT})$	Response Time	0.80	0.80	R	$\sqrt{3}$	1.00	1.00	0.46	0.46	∞
9	$U(T_{IT})$	Integration Time	2.60	2.60	R	$\sqrt{3}$	1.00	1.00	1.50	1.50	∞
10	$U(A_{NO})$	RF ambient conditions–noise	3.00	3.00	R	$\sqrt{3}$	1.00	1.00	1.73	1.73	∞
11	$U(A_{RF})$	RF ambient conditions–reflections	3.00	3.00	R	$\sqrt{3}$	1.00	1.00	1.73	1.73	∞
12	$U(PR_{PO})$	Probe positioner mech. Restrictions	0.40	0.40	R	$\sqrt{3}$	1.00	1.00	0.23	0.23	∞
13	$U(PR_{PP})$	Probe positioning with respect to phanton	2.90	2.90	R	$\sqrt{3}$	1.00	1.00	1.67	1.67	∞
14	$U(PP_{MAX})$	Post-processing(for max. SAR evaluation)	2.00	2.00	R	$\sqrt{3}$	1.00	1.00	1.15	1.15	∞
15	$U(DU)$	Device Holder Uncertainty	3.60	3.60	N	1.00	1.00	1.00	3.60	3.60	5.00
16	$U(PD_{SAM})$	Test sample positioning	8.32	6.37	N	1.00	1.00	1.00	8.32	6.37	9.00
17	$U(PS)$	Power scaling	0.00	0.00	R	$\sqrt{3}$	1.00	1.00	0.00	0.00	∞
18	$U(DD)$	Drift of output power(measured SAR drift)	5.00	5.00	R	$\sqrt{3}$	1.00	1.00	2.89	2.89	∞
19	$U(PU)$	Phantom Uncertainty	6.10	6.10	R	$\sqrt{3}$	1.00	1.00	3.52	3.52	∞
20	$U(CS_{alg})$	Algorithm for correcting SAR for deviations in permittivity and	1.90	1.90	N	1.00	1.00	0.84	1.90	1.60	∞
21	$U(EC_{M})$	Liquid Conductivity (meas.)	1.53	1.53	N	1.00	0.78	0.71	1.19	1.09	5.00
22	$U(EP_{M})$	Liquid Permittivity (meas.)	3.07	3.07	N	1.00	0.23	0.26	0.71	0.80	5.00
23	$U(EC_{TU})$	Liquid conductivity(temperature uncertain	4.16	4.16	R	$\sqrt{3}$	0.78	0.71	1.87	1.71	∞
24	$U(EP_{TU})$	Liquid permittivity(temperature uncertaint	0.84	0.84	R	$\sqrt{3}$	0.23	0.26	0.11	0.13	∞
/		***Uc(sar)* Combined standard uncertainty (%)**							12.97	11.74	50
/		**Extended uncertainty *U*(%)**							25.94	23.48	

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Uncertainty of SAR equipment for measurement Body 3 GHz to 6 GHz

No.		Error Description	Uncertainty Value (1 g) (%)	Uncertainty Value (10 g) (%)	Probe Dist.	Div.	C_i (1 g)	C_i (10 g)	$U_i(y)$ (1 g)	$U_i(y)$ (10 g)	V_i or V_{eff}
1	$U(PR_{cal})$	Probe Calibration	6.30	6.30	N	1.00	1.00	1.00	6.30	6.30	∞
2	$U(PR_{iso})$	Isotropy	1.87	1.87	R	$\sqrt{3}$	1.00	1.00	1.08	1.08	∞
3	$U(L)$	Linearity	0.60	0.60	R	$\sqrt{3}$	1.00	1.00	0.35	0.35	∞
4	$U(PR_{mr})$	Probe modulation response	2.40	2.40	R	$\sqrt{3}$	1.00	1.00	1.39	1.39	∞
6	$U(DL)$	Detection Limits	1.00	1.00	R	$\sqrt{3}$	1.00	1.00	0.58	0.58	∞
5	$U(BE)$	Boundary effect	2.00	2.00	R	$\sqrt{3}$	1.00	1.00	1.15	1.15	∞
7	$U(RE)$	Readout Electronics	0.30	0.30	N	1.00	1.00	1.00	0.30	0.30	∞
8	$U(T_{RT})$	Response Time	0.80	0.80	R	$\sqrt{3}$	1.00	1.00	0.46	0.46	∞
9	$U(T_{IT})$	Integration Time	2.60	2.60	R	$\sqrt{3}$	1.00	1.00	1.50	1.50	∞
10	$U(A_{NO})$	RF ambient conditions–noise	3.00	3.00	R	$\sqrt{3}$	1.00	1.00	1.73	1.73	∞
11	$U(A_{RF})$	RF ambient conditions–reflections	3.00	3.00	R	$\sqrt{3}$	1.00	1.00	1.73	1.73	∞
12	$U(PR_{PT})$	Probe positioner mech. Restrictions	0.80	0.80	R	$\sqrt{3}$	1.00	1.00	0.46	0.46	∞
13	$U(PR_{PP})$	Probe positioning with respect to phanton	6.70	6.70	R	$\sqrt{3}$	1.00	1.00	3.87	3.87	∞
14	$U(PP_{MEA})$	Post-processing(for max. SAR evaluation)	4.00	4.00	R	$\sqrt{3}$	1.00	1.00	2.31	2.31	∞
15	$U(DU)$	Device Holder Uncertainty	3.60	3.60	N	1.00	1.00	1.00	3.60	3.60	5.00
16	$U(PO_{SAT})$	Test sample positioning	7.76	6.03	N	1.00	1.00	1.00	7.76	6.03	9.00
17	$U(PS)$	Power scaling	0.00	0.00	R	$\sqrt{3}$	1.00	1.00	0.00	0.00	∞
18	$U(PD)$	Drift of output power(measured SAR drift)	5.00	5.00	R	$\sqrt{3}$	1.00	1.00	2.89	2.89	∞
19	$U(PU)$	Phantom Uncertainty	6.60	6.60	R	$\sqrt{3}$	1.00	1.00	3.81	3.81	∞
20	$U(CS_{ALG})$	Algorithm for correcting SAR for deviations in permittivity and	1.90	1.90	N	1.00	1.00	0.84	1.90	1.60	∞
21	$U(EC_{MS})$	Liquid Conductivity (meas.)	1.50	1.50	N	1.00	0.78	0.71	1.17	1.07	5.00
22	$U(EP_{MS})$	Liquid Permittivity (meas.)	2.23	2.23	N	1.00	0.23	0.26	0.51	0.58	5.00
23	$U(EC_{TSU})$	Liquid conductivity(temperature uncertain	2.12	2.12	R	$\sqrt{3}$	0.78	0.71	0.95	0.87	∞
24	$U(EP_{TSU})$	Liquid permittivity(temperature uncertaint	0.40	0.40	R	$\sqrt{3}$	0.23	0.26	0.05	0.06	∞
/		***Uc(sar)* Combined standard uncertainty (%)**							**13.26**	12.27	**71**
/		**Extended uncertainty *U*(%)**							**26.52**	24.54	

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5. ANSI/IEEE C95.1-2005 RF EXPOSURE LIMIT

In order for users to be aware of the body-worn operating requirements for meeting RF exposure compliance, operating instructions and cautions statements are included in the user's manual.

5.1 Uncontrolled Environment

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

5.2 Controlled Environment

Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. This exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Human Exposure Limits

	UNCONTROLLED ENVIRONMENT General Population (W/kg) or (mW/g)	CONTROLLED ENVIROMENT Professional Population (W/kg) or (mW/g)
SPATIAL PEAK SAR[1] Brain	1.60	8.00
SPATIAL AVERAGE SAR[2] Whole Body	0.08	0.40
SPATIAL PEAK SAR[3] Hands, Feet, Ankles, Wrists	4.00	20.00

[1] The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.
[2] The Spatial Average value of the SAR averaged over the whole body.
[3] The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

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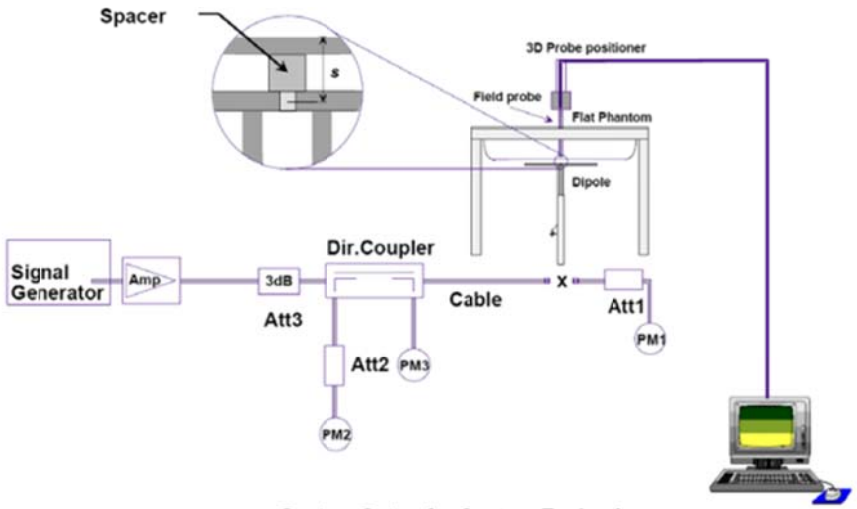
6. SYSTEM AND LIQUID VERIFICATION

6.1 System Verification setup



System Setup for System Evaluation

The system performance check verifies that the system operates within its specifications. System and operator errors can be detected and corrected. It is recommended that the system performance check be performed prior to any usage of the system in order to guarantee reproducible results. The system performance check uses normal SAR measurements in a simplified setup with a well characterized source. This setup was selected to give a high sensitivity to all parameters that might fail or vary over time. The system check does not intend to replace the calibration of the components, but indicates situations where the system uncertainty is exceeded due to drift or failure.

In the simplified setup for system evaluation, the DUT is replaced by a calibrated dipole and the power source is replaced by a continuous wave that comes from a signal generator. The calibrated dipole must be placed beneath the flat phantom section of the SAM twin phantom with the correct distance holder. The distance holder should touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom. The equipment setup is shown below:

1. Signal Generator
2. Amplifier
3. Directional Coupler
4. Power Meter
5. Calibrated Dipole

The output power on dipole port must be calibrated to 30 dBm (1000 mW) before dipole is connected.

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Numerical reference SAR values (W/kg) for reference dipole and flat phantom

1	2	3	4	5	6
Frequency MHz	Phantom shell thickness mm	1 g SAR W/kg	10 g SAR W/kg	Local SAR at surface (above feedpoint) W/kg	Local SAR at surface (y = 2 cm offset from feedpoint) W/kg
300	6,3	3,02	2,04	4,40	2,10
300	2,0	2,85	1,94	4,14	2,00
450	6,3	4,92	3,28	7,20	3,20
450	2,0	4,58	3,06	6,75	2,96
750	2,0	8,49	5,55	12,6	4,59
835	2,0	9,56	6,22	14,1	4,90
900	2,0	10,9	6,99	16,4	5,40
1 450	2,0	29,0	16,0	50,2	6,50
1 800	2,0	38,4	20,1	69,5	6,80
1 900	2,0	39,7	20,5	72,1	6,60
1 950	2,0	40,5	20,9	72,7	6,60
2 000	2,0	41,1	21,1	74,6	6,50
2 450	2,0	52,4	24,0	104	7,70
2 585	2,0	55,9	24,4	119	7,90
2 600	2,0	56,3	24,6	113	8,29
3 000	2,0	63,8	25,7	140	9,50
3 500	2,0	67,1	25,0	169	12,1
3 700	2,0	67,4	24,2	178	12,7
5 000	2,0	77,9	22,1	305	15,1
5 200	2,0	76,5	21,6	310	15,9
5 500	2,0	83,3	23,4	349	18,1
5 800	2,0	78,0	21,9	341	20,3

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6.2 Liquid Validation

The dielectric parameters were checked prior to assessment using the DAK dielectric probe kit. The dielectric parameters measured are reported in each correspondent section.

6.3 Recommended Tissue Dielectric Parameters

The head tissue dielectric parameters recommended by KDB 865664 have been incorporated in the following table.

Target Frequency	Head		Body	
(MHz)	ε_r	σ (S/m)	ε_r	σ (S/m)
150	52.3	0.76	61.9	0.80
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.90	55.2	0.97
900	41.5	0.97	55.0	1.05
915	41.5	0.98	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1800 – 2000	40.0	1.40	53.3	1.52
2450	39.2	1.80	52.7	1.95
3000	38.5	2.40	52.0	2.73
5800	35.3	5.27	48.2	6.00

(ε_r = relative permittivity, σ = conductivity and $\rho = 1000\ kg/m^3$)

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6.4 Liquid Confirmation Results

Frequency (MHz)	Tissue Type	Liquid Temp.(℃)	Parameter	Target Value	Measured Value	Deviation (%)	Limit (%)	Date
2450	Head	20.54	Permitivity	37.50	39.20	4.53%	± 5	05/27/2014
			Conductivity	1.85	1.80	-2.70%	± 5	
2450	Body	21.20	Permitivity	54.70	52.70	-3.66%	± 5	05/29/2014
			Conductivity	1.99	1.95	-2.01%	± 5	
5200	Head	20.83	Permitivity	36.00	35.20	-2.22%	± 5	06/02/2014
			Conductivity	4.66	4.59	-1.50%	± 5	
5200	Body	21.00	Permitivity	49.03	48.20	-1.69%	± 5	06/16/2014
			Conductivity	5.35	5.52	3.18%	± 5	
5300	Head	21.20	Permitivity	35.90	35.40	-1.39%	± 5	06/09/2014
			Conductivity	4.76	4.70	-1.26%	± 5	
5300	Body	20.64	Permitivity	48.90	47.40	-3.07%	± 5	06/17/2014
			Conductivity	5.46	5.56	1.83%	± 5	
5600	Head	21.20	Permitivity	35.50	34.40	-3.10%	± 5	06/11/2014
			Conductivity	5.07	5.06	-0.20%	± 5	
5600	Body	20.84	Permitivity	48.48	48.00	-0.99%	± 5	06/14/2014
			Conductivity	5.79	5.98	3.28%	± 5	
5800	Head	21.45	Permitivity	35.30	34.20	-3.12%	± 5	06/12/2014
			Conductivity	5.27	5.20	-1.33%	± 5	
5800	Body	20.91	Permitivity	48.20	47.20	-2.07%	± 5	06/13/2014
			Conductivity	6.00	6.26	4.33%	± 5	

6.5 System Verification Results

Freq. (MHz)	Tissue Type	Amb. Temp (℃)	Liquid Temp (℃)	Input Power (mW)	Dipole S/N	Probe S/N	Measured SAR 1g	1W Normalized SAR 1g	1W Target SAR 1g	Deviation (%)	Date
2450	Head	21.2	20.8	250	923	3666	13.6	54.4	52.4	3.82%	05/27/2014
2450	Body	21.3	21.0	250	923	3666	13.4	53.6	52.1	2.88%	05/29/2014
5200	Head	21.1	20.8	250	1094	3666	18.4	73.6	76.3	-3.54%	06/02/2014
5200	Body	21.4	21.1	250	1094	3666	17.7	70.8	74.6	-5.09%	06/16/2014
5300	Head	21.3	21.0	250	1094	3666	20.5	82.0	79.8	2.76%	06/09/2014
5300	Body	20.9	20.7	250	1094	3666	18.1	72.4	76.3	-5.11%	06/17/2014
5600	Head	21.2	20.9	250	1094	3666	20.1	80.4	80.2	0.25%	06/11/2014
5600	Body	21.1	20.9	250	1094	3666	20.2	80.8	80.8	0.00%	06/14/2014
5800	Head	21.2	21.0	250	1094	3666	19.0	76.0	77.9	-2.44%	06/12/2014
5800	Body	21.3	21.1	250	1094	3666	19.1	76.4	75.2	1.60%	06/13/2014

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7. SAR MEASUREMENT PROCEDURES

Step 1: Power Reference Measurement

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The Minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. The minimum distance of probe sensors to surface is 2 mm. This distance cannot be smaller than the Distance of sensor calibration points to probe tip as defined in the probe properties.

Step 2: Area Scan

The Area Scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in DASY software can find the maximum locations even in relatively coarse grids. When an Area Scan has measured all reachable points, it computes the field maximal found in the scanned area, within a range of the global maximum. The range (in dB) is specified in the standards for compliance testing.

For example, a 2 dB range is required in IEEE Standard 1528 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan). If only one Zoom Scan follows the Area Scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of Zoom Scans has to be increased accordingly.

Step 3: Zoom Scan

Zoom Scans are used to assess the peak spatial SAR values within a cubic averaging volume containing 1 g and 10 g of simulated tissue. The Zoom Scan measures 5x5x7 points within a cube whose base faces are centered on the maxima found in a preceding area scan job within the same procedure. When the measurement is done, the Zoom Scan evaluates the averaged SAR for 1 g and 10 g and displays these values next to the job's label.

Step 4: Power drift measurement

The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the last Power Reference Measurement. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 1.

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Step 5: Z-Scan

The Z Scan measures points along a vertical straight line. The line runs along the Z-axis of a one dimensional grid. In order to get a reasonable extrapolation, the extrapolated distance should not be larger than the step size in Z-direction.

* Z Scan Report on Liquid Measure the height ANNEX C. Liquid Depth photo to replace

			≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface			5 ± 1 mm	½·δ·ln(2) ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location			30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}			≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
			When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	
Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	≤ 1.5·$\Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm

Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.

* When zoom scan is required and the *reported* SAR from the area scan based *1-g SAR estimation* procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.

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8. TEST EQUIPMENT LIST

Manufacturer	Model	Serial No.	Description	Cal. Date	Cal. Interval	Cal. Due	Used
STAUBLI	RX90XL	F07/56X0A1/A/01	DASY5 Robot	N/A	N/A	N/A	V
STAUBLI	CS8C Speag TX90XL	F07/56X0A1/C/01	DASY5 Controller	N/A	N/A	N/A	V
Speag	SE UMS 011 AA	1019	DASY5 Measurement Server	N/A	N/A	N/A	V
STAUBLI	RX90BL	F01/5J92A1/A/01	DASY4 Robot	N/A	N/A	N/A	
STAUBLI	CS7MBsp RX90BL	F01/5J92A1/C/01	DASY4 Controller	N/A	N/A	N/A	
Speag	SE UMS 001 BC	1164	DASY4 Measurement Server	N/A	N/A	N/A	
STAUBLI	SP1	D 211 421 02	Robot Remote Control	N/A	N/A	N/A	V
STAUBLI	Manual Control III Operator	D 221 340 01	Robot Remote Control	N/A	N/A	N/A	V
Di-Soric	LB5	80	Light Beam	N/A	N/A	N/A	
Di-Soric	LB2	270	Light Beam	N/A	N/A	N/A	
Speag	Twin Phantom	TP-1069	Head Phantom	N/A	N/A	N/A	
Speag	Twin Phantom	TP-1086	Head Phantom	N/A	N/A	N/A	
Speag	Twin Phantom	TP-1112	Head Phantom	N/A	N/A	N/A	
Speag	Twin Phantom	TP-1155	Head Phantom	N/A	N/A	N/A	
Speag	ELI4 Phantom	SM 000 T01 DA	Body Phantom	N/A	N/A	N/A	V
Speag	Triple Phantom	QD 000 P51 CA	Body Phantom	N/A	N/A	N/A	
Speag	Mounting Device	N/A	Head Positioner	N/A	N/A	N/A	
Speag	Mounting Device	SM LH1 001 AC	Laptop Holder	N/A	N/A	N/A	V
Agilent	85033E	N/A	Calibration Kit	N/A	N/A	N/A	V
Speag	DAE4	444	DAE	12/02/2013	1 Year	12/01/2014	V
Speag	DAE3	383	DAE	12/02/2013	1 Year	12/01/2014	
Speag	EX3DV4	3666	SAR Probe	11/27/2013	1 Year	11/26/2014	V
Speag	ES3DV3	3171	SAR Probe	11/22/2013	1 Year	11/21/2014	
Speag	D2450V2	923	Dipole Antenna	11/13/2013	1 Year	11/12/2014	V
Speag	D5GHzV2	1094	Dipole Antenna	12/16/2013	1 Year	12/15/2014	V
Speag	DAK-3.5	1140	Dielectric Assessment Kit	11/26/2013	1 Year	11/25/2014	V
HP	8665B	3744A01333	Signal Generator	11/11/2013	1 Year	11/10/2014	V
EMPOWER	BBS3Q7ELU-2001	1009D/C0105	High Power RF Amplifier	12/27/2013	1 Year	12/26/2014	V
VARIAN	VZC6961K11212	6673	RF Amplifier	12/09/2013	1 Year	12/08/2014	V
HP	778D	12679	Dual Directional Coupler	11/04/2013	1 Year	11/03/2014	
Agilent	772D	2839A01119	Dual Directional Coupler	11/04/2013	1 Year	11/03/2014	V
Agilent	E4419B	MY41291366	Dual Power Meter	11/26/2013	1 Year	11/25/2014	V
HP	437B	3125U25121	Power Meter	04/30/2014	1 Year	04/29/2015	V
HP	8481H	3318A18722	Power Meter Sensor	11/08/2013	1 Year	11/07/2014	V
HP	8481H	3318A17600	Power Meter Sensor	11/08/2013	1 Year	11/07/2014	V
HP	8481A	155A14928	Power Meter Sensor	11/05/2013	1 Year	11/04/2014	V
HP	8491A	50864	Coaxial Fixed Attenuator	10/30/2013	1 Year	10/29/2014	V
HP	8491A	18610	Coaxial Fixed Attenuator	10/30/2013	1 Year	10/29/2014	
WAAINWRIGHT	WLJS1500-6EF	1	Low Pass Filter	12/07/2013	1 Year	12/06/2014	
WAAINWRIGHT	WLJS3000-6EF	1	Low Pass Filter	12/07/2013	1 Year	12/06/2014	
WAAINWRIGHT	WLJS6000-7EF	1	Low Pass Filter	12/07/2013	1 Year	12/06/2014	V
Agilent	E8357A	US41070399	Pna Series Network Analyzer	11/05/2013	1 Year	11/04/2014	V
Rohde-Schwarz	FSP	100017	Spectrum Analyzer	11/05/2013	1 Year	11/04/2014	V
LKM electronic GmbH	DTM3000-spezial	3247	Digital Hand-held Thermometers	01/20/2014	1 Year	01/19/2015	V
CAS	TE-201	N/A	Hygro-Thermometer	01/20/2014	1 Year	01/19/2015	V
CAS	TE-201	N/A	Hygro-Thermometer	01/20/2014	1 Year	01/19/2015	

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9. RF CONDUCTED POWER

9.1 Antenna 0

< 802.11b >

Mode	Freq. (MHz)	CH	802.11b Conducted Power (dBm)				Tolerance (dBm)
			Data Rate (Mbps)				
			1	2	5.5	11	
802.11b	2412	1	**18.02**	17.93	17.86	17.79	18 ± 1.5
	2437	6	**18.32**	18.22	18.15	18.04	
	2462	11	**17.92**	17.83	17.77	17.69	

< 802.11g >

Mode	Freq. (MHz)	CH	802.11g Conducted Power (dBm)								Tolerance (dBm)
			Data Rate (Mbps)								
			6	9	12	18	24	36	48	54	
802.11g	2412	1	**15.21**	15.16	15.09	15.02	14.96	14.88	14.76	**14.71**	15 ± 1.5
	2437	6	**18.05**	17.96	17.88	17.81	17.75	17.68	17.57	**17.53**	18 ± 1.5
	2462	11	**15.05**	14.97	14.91	14.83	14.75	14.64	14.58	**14.55**	15 ± 1.5

< 802.11n HT20 >

Mode	Freq. (MHz)	CH	802.11n HT20 Conducted Power (dBm)								Tolerance (dBm)
			Data Rate (Mbps)								
			6.5	13	20	26	39	52	58	65	
802.11n HT20	2412	1	**16.05**	15.95	15.84	15.68	15.45	15.24	15.15	**15.10**	16 ± 1.5
	2437	6	**17.88**	17.78	17.67	17.59	17.43	17.29	17.23	**17.18**	18 ± 1.5
	2462	11	**16.15**	16.03	15.94	15.86	15.70	15.57	15.51	**15.46**	16 ± 1.5

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< 802.11a >

Mode	Freq. (MHz)	CH	802.11a Conducted Power (dBm)								Tolerance (dBm)
			Data Rate (Mbps)								
			6	9	12	18	24	36	48	54	
802.11a	5180	36	**11.86**	11.79	11.72	11.68	11.59	11.53	11.48	11.44	12 ± 1.5
	5200	40	**12.67**	12.61	12.53	12.46	12.37	12.31	12.25	12.21	
	5220	44	**12.25**	12.19	12.12	12.07	12.01	11.93	11.86	11.79	
	5240	48	**12.08**	12.02	11.96	11.88	11.79	11.73	11.68	11.63	
	5260	52	**15.27**	15.19	15.11	15.06	14.98	14.91	14.84	14.77	15 ± 1.5
	5280	56	**14.07**	13.97	13.91	13.84	13.77	13.69	13.61	13.55	14 ± 1.5
	5300	60	**14.12**	14.08	14.01	13.89	13.82	13.74	13.69	13.64	
	5320	64	**13.93**	13.85	13.77	13.71	13.58	13.49	13.42	13.37	
	5500	100	**14.02**	13.95	13.89	13.78	13.70	13.62	13.55	13.49	
	5520	104	**14.11**	14.03	13.96	13.88	13.79	13.73	13.65	13.59	
	5540	108	**13.90**	13.81	13.74	13.68	13.61	13.49	13.43	13.38	
	5560	112	**15.26**	15.19	15.11	15.02	14.96	14.86	14.79	14.70	15 ± 1.5
	5580	116	**15.35**	15.27	15.17	15.08	15.01	14.93	14.85	14.79	
	5600	120	**14.92**	14.85	14.77	14.71	14.65	14.58	14.50	14.39	
	5620	124	**15.02**	14.95	14.88	14.79	14.66	14.57	14.51	14.46	
	5640	128	**15.06**	14.97	14.91	14.83	14.77	14.69	14.60	14.48	
	5660	132	**15.08**	14.98	14.91	14.85	14.72	14.64	14.55	14.49	
	5680	136	**15.12**	15.05	14.97	14.88	14.79	14.71	14.61	14.55	
	5700	140	**15.28**	15.21	15.14	15.02	14.95	14.82	14.69	14.58	
	5745	149	**14.05**	13.94	13.87	13.79	13.72	13.63	13.55	13.47	14 ± 1.5
	5765	153	**14.33**	14.28	14.21	14.16	14.09	14.02	13.88	13.85	
	5785	157	**14.28**	14.25	14.17	14.08	14.01	13.95	13.89	13.85	
	5805	161	**14.12**	14.03	13.99	13.94	13.84	13.78	13.71	13.63	
	5825	165	**14.01**	13.97	13.93	13.86	13.77	13.69	13.63	13.58	

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< 802.11n HT20 (5GHz) >

Mode	Freq. (MHz)	CH	802.11n HT20 (5GHz) Conducted Power (dBm)								Tolerance (dBm)
			Data Rate (Mbps)								
			6.5	13	20	26	39	52	58	65	
802.11n HT20	5180	36	**10.05**	9.98	9.85	9.75	9.69	9.58	9.52	9.44	10 ± 1.5
	5200	40	**10.28**	10.20	10.13	10.06	9.97	9.84	9.76	9.69	10.5 ± 1.5
	5220	44	**9.87**	9.76	9.64	9.55	9.42	9.35	9.25	9.16	
	5240	48	**10.20**	10.12	10.03	9.92	9.78	9.65	9.57	9.50	
	5260	52	**11.03**	10.94	10.81	10.72	10.65	10.59	10.52	10.41	12 ± 1.5
	5280	56	**11.66**	11.58	11.49	11.40	11.32	11.28	11.19	11.11	
	5300	60	**11.25**	11.14	11.05	10.99	10.86	10.75	10.65	10.53	11.5 ± 1.5
	5320	64	**10.78**	10.65	10.53	10.46	10.38	10.29	10.15	10.08	
	5500	100	**11.89**	11.76	11.65	11.52	11.45	11.37	11.23	11.14	12.5 ± 1.5
	5520	104	**11.95**	11.86	11.74	11.62	11.58	11.45	11.36	11.22	
	5540	108	**11.86**	11.75	11.69	11.58	11.51	11.46	11.37	11.30	13 ± 1.5
	5560	112	**12.67**	12.59	12.52	12.46	12.37	12.29	12.24	12.14	
	5580	116	**13.42**	13.33	13.25	13.18	13.13	13.05	12.98	12.89	13.5 ± 1.5
	5600	120	**12.95**	12.86	12.76	12.68	12.61	12.55	12.44	12.38	
	5620	124	**12.87**	12.75	12.67	12.59	12.50	12.42	12.31	12.25	
	5640	128	**13.26**	13.18	13.05	12.97	12.93	12.86	12.76	12.65	
	5660	132	**13.13**	13.04	12.89	12.78	12.67	12.59	12.53	12.41	14 ± 1.5
	5680	136	**13.17**	13.10	13.03	12.96	12.86	12.79	12.69	12.61	
	5700	140	**13.02**	12.92	12.86	12.73	12.61	12.52	12.37	12.25	
	5745	149	**12.65**	12.58	12.51	12.44	12.32	12.23	12.15	12.07	12.5 ± 1.5
	5765	153	**12.54**	12.44	12.35	12.28	12.19	12.08	11.97	11.88	
	5785	157	**12.76**	12.65	12.58	12.49	12.38	12.31	12.24	12.18	
	5805	161	**12.43**	12.37	12.29	12.21	12.14	12.05	11.96	11.88	
	5825	165	**12.54**	12.47	12.38	12.30	12.21	12.14	12.06	11.98	

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< 802.11n HT40 (5GHz) >

Mode	Freq. (MHz)	CH	802.11n HT40 (5GHz) Conducted Power (dBm)								Tolerance (dBm)
			Data Rate (Mbps)								
			13.5	27	40.5	54	81	108	121.5	135	
802.11n HT40	5190	38	**9.90**	9.82	9.74	9.65	9.52	9.41	9.36	9.28	10 ± 1.5
	5230	46	**9.82**	9.72	9.66	9.55	9.48	9.45	9.39	9.32	
	5270	54	**10.28**	10.18	10.12	10.07	9.98	9.86	9.75	9.62	11.5 ± 1.5
	5310	62	**10.12**	10.03	9.94	9.86	9.75	9.68	9.58	9.42	10.5 ± 1.5
	5510	102	**8.06**	7.97	7.89	7.80	7.68	7.59	7.52	7.43	9 ± 1.5
	5550	110	**8.33**	8.26	8.21	8.14	8.07	8.01	7.92	7.85	9.5 ± 1.5
	5590	118	**9.70**	9.62	9.53	9.46	9.38	9.26	9.18	9.09	10 ± 1.5
	5630	126	**9.56**	9.45	9.38	9.32	9.26	9.18	9.16	9.05	
	5670	134	**9.43**	9.36	9.22	9.15	9.07	8.96	8.85	8.72	
	5755	151	**8.68**	8.59	8.52	8.43	8.35	8.24	8.17	8.06	9 ± 1.5
	5795	159	**8.82**	8.73	8.65	8.58	8.51	8.43	8.33	8.24	

9.2 Antenna 1

< 802.11b >

Mode	Freq. (MHz)	CH	802.11b Conducted Power (dBm)				Tolerance (dBm)
			Data Rate (Mbps)				
			1	2	5.5	11	
802.11b	2412	1	**18.02**	17.88	17.79	17.68	18 ± 1.5
	2437	6	**18.25**	18.13	18.02	17.88	
	2462	11	**18.18**	18.05	17.89	17.76	

< 802.11g >

Mode	Freq. (MHz)	CH	802.11g Conducted Power (dBm)								Tolerance (dBm)
			Data Rate (Mbps)								
			6	9	12	18	24	36	48	54	
802.11g	2412	1	**15.02**	14.96	14.88	14.81	14.73	14.68	14.61	14.55	15 ± 1.5
	2437	6	**18.25**	18.18	18.11	18.03	17.96	17.88	17.82	17.75	18 ± 1.5
	2462	11	**15.04**	14.96	14.88	14.81	14.73	14.68	14.61	14.56	15 ± 1.5

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< 802.11n HT20 >

Mode	Freq. (MHz)	CH	802.11n HT20 Conducted Power (dBm)								Tolerance (dBm)
			Data Rate (Mbps)								
			6.5	13	20	26	39	52	58	65	
802.11n HT20	2412	1	**16.30**	16.20	16.10	16.02	15.84	15.64	15.52	15.39	16 ± 1.5
	2437	6	**18.05**	17.93	17.83	17.76	17.60	17.47	17.39	17.36	18 ± 1.5
	2462	11	**16.05**	15.93	15.83	15.76	15.60	15.47	15.39	15.34	16 ± 1.5

< 802.11a >

Mode	Freq. (MHz)	CH	802.11a Conducted Power (dBm)								Tolerance (dBm)
			Data Rate (Mbps)								
			6	9	12	18	24	36	48	54	
802.11a	5180	36	**12.07**	12.04	11.97	11.92	11.85	11.77	11.68	11.63	12 ± 1.5
	5200	40	**11.98**	11.93	11.85	11.77	11.69	11.63	11.58	11.52	
	5220	44	**12.17**	12.12	12.07	12.01	11.96	11.89	11.83	11.77	
	5240	48	**12.29**	12.25	12.19	12.13	12.06	11.99	11.93	11.86	
	5260	52	**15.20**	15.15	15.08	15.02	14.94	14.86	14.81	14.75	15 ± 1.5
	5280	56	**13.98**	13.95	13.88	13.81	13.75	13.68	13.61	13.55	14 ± 1.5
	5300	60	**14.01**	13.96	13.88	13.82	13.74	13.66	13.60	13.56	
	5320	64	**14.34**	14.28	14.22	14.17	14.11	14.02	13.95	13.91	
	5500	100	**13.94**	13.88	13.81	13.75	13.69	13.63	13.59	13.52	
	5520	104	**14.51**	14.44	14.39	14.31	14.26	14.22	14.17	14.12	
	5540	108	**14.20**	14.15	14.08	14.01	13.96	13.89	13.84	13.79	
	5560	112	**15.45**	15.41	15.36	15.28	15.20	15.14	15.07	14.97	15 ± 1.5
	5580	116	**15.14**	15.06	15.01	14.95	14.88	14.81	14.73	14.68	
	5600	120	**15.30**	15.25	15.18	15.11	15.03	14.94	14.86	14.81	
	5620	124	**15.25**	15.19	15.13	15.08	15.02	14.96	14.88	14.81	
	5640	128	**15.30**	15.23	15.18	15.11	15.03	14.96	14.85	14.78	
	5660	132	**15.27**	15.22	15.12	15.05	14.97	14.89	14.80	14.68	
	5680	136	**15.21**	15.13	15.08	15.01	14.93	14.84	14.78	14.72	
	5700	140	**15.08**	15.05	14.96	14.89	14.83	14.77	14.69	14.66	
	5745	149	**14.21**	14.15	14.06	13.98	13.94	13.85	13.78	13.73	14 ± 1.5
	5765	153	**14.11**	14.01	13.93	13.85	13.78	13.71	13.65	13.58	
	5785	157	**14.23**	14.19	14.13	14.08	14.01	13.93	13.86	13.79	
	5805	161	**14.07**	14.02	13.96	13.89	13.83	13.78	13.68	13.66	
	5825	165	**14.41**	14.32	14.25	14.19	14.10	14.03	13.96	13.91	

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< 802.11n HT20 (5GHz) >

Mode	Freq. (MHz)	CH	802.11n HT20 (5GHz) Conducted Power (dBm)								Tolerance (dBm)
			Data Rate (Mbps)								
			6.5	13	20	26	39	52	58	65	
802.11n HT20	5180	36	**10.45**	10.38	10.31	10.24	10.19	10.11	10.06	10.03	10 ± 1.5
	5200	40	**10.37**	10.29	10.18	10.09	10.02	9.86	9.79	9.68	10.5 ± 1.5
	5220	44	**10.25**	10.18	10.09	9.97	9.89	9.78	9.65	9.58	
	5240	48	**9.92**	9.83	9.75	9.68	9.59	9.49	9.42	9.36	
	5260	52	**11.08**	10.99	10.86	10.76	10.68	10.63	10.55	10.42	12 ± 1.5
	5280	56	**11.33**	11.26	11.16	11.08	10.98	10.93	10.85	10.76	
	5300	60	**11.02**	10.89	10.79	10.68	10.64	10.56	10.43	10.35	11.5 ± 1.5
	5320	64	**10.97**	10.87	10.82	10.73	10.66	10.61	10.57	10.49	
	5500	100	**12.05**	11.97	11.86	11.82	11.73	11.65	11.59	11.43	12.5 ± 1.5
	5520	104	**11.86**	11.75	11.63	11.58	11.52	11.43	11.36	11.28	
	5540	108	**12.14**	12.04	11.96	11.87	11.75	11.69	11.63	11.58	13 ± 1.5
	5560	112	**11.91**	11.82	11.76	11.74	11.69	11.62	11.55	11.48	
	5580	116	**11.94**	11.86	11.80	11.73	11.65	11.58	11.49	11.42	13.5 ± 1.5
	5600	120	**12.04**	11.98	11.87	11.76	11.66	11.58	11.50	11.44	
	5620	124	**12.30**	12.23	12.15	12.07	12.02	11.96	11.87	11.75	
	5640	128	**12.25**	12.19	12.11	12.04	11.96	11.87	11.75	11.69	
	5660	132	**12.32**	12.20	11.13	11.04	10.97	10.87	10.76	10.64	14 ± 1.5
	5680	136	**12.13**	12.05	11.98	11.89	11.84	11.76	11.68	11.55	
	5700	140	**12.32**	12.25	12.18	12.07	11.96	11.85	11.76	11.63	
	5745	149	**11.72**	11.65	11.56	11.43	11.38	11.31	11.25	11.18	12.5 ± 1.5
	5765	153	**11.48**	11.38	11.27	11.20	11.13	11.05	10.96	10.86	
	5785	157	**11.66**	11.58	11.49	11.43	11.35	11.28	11.18	11.09	
	5805	161	**11.73**	11.62	11.56	11.48	11.39	11.30	11.24	11.16	
	5825	165	**12.15**	12.07	11.97	11.86	11.74	11.68	11.63	11.54	

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< 802.11n HT40 (5GHz) >

Mode	Freq. (MHz)	CH	802.11n HT40 (5GHz) Conducted Power (dBm)								Tolerance (dBm)
			Data Rate (Mbps)								
			13.5	27	40.5	54	81	108	121.5	135	
802.11n HT40	5190	38	**10.10**	10.01	9.89	9.77	9.68	9.60	9.46	9.32	10 ± 1.5
	5230	46	**9.94**	9.82	9.71	9.59	9.52	9.41	9.33	9.18	
	5270	54	**11.46**	11.34	11.23	11.15	11.07	10.96	10.82	10.70	11.5 ± 1.5
	5310	62	**10.61**	10.53	10.41	10.35	10.22	10.18	10.12	10.04	10.5 ± 1.5
	5510	102	**7.38**	7.20	7.13	7.04	6.96	9.85	9.72	9.66	9 ± 1.5
	5550	110	**8.18**	8.03	7.95	7.82	7.77	7.69	7.61	7.53	9.5 ± 1.5
	5590	118	**8.43**	8.35	8.22	8.14	8.06	7.99	7.93	7.86	10 ± 1.5
	5630	126	**8.85**	8.75	8.68	8.53	8.40	8.33	8.25	8.15	
	5670	134	**8.96**	8.87	8.78	8.66	8.58	8.43	8.32	8.25	
	5755	151	**8.62**	8.54	8.47	8.42	8.36	8.29	8.22	8.15	9 ± 1.5
	5795	159	**8.54**	8.43	8.36	8.27	8.18	8.11	8.04	7.97	

Justification for reduced test configurations for WIFI channels per KDB Publication 248227 D01v01r02 and October 2012/April 2013 FCC/TCB Meeting Notes:

- For 2.4 GHz, highest average RF output power channel for the lowest data rate for IEEE 802.11b were selected for SAR evaluation. Other IEEE 802.11 modes (including 802.11g/n) were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11b mode.
- For 5 GHz, highest average RF output power channel for the lowest data rate for IEEE 802.11a were selected for SAR evaluation. Other IEEE 802.11 modes (including 802.11n 20 MHz and 40 MHz) were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11a mode.
- When the maximum extrapolated peak SAR of the zoom scan for the maximum output channel is <1.6 W/kg and the reported 1g averaged SAR is <0.8 W/kg, SAR testing on other channels is not required. Otherwise, the other default (or corresponding required) test channels were additionally tested using the lowest data rate.
- The bolded data rate and channel above were tested for SAR.

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10.SAR TEST RESULTS

< 802.11b/n_HT20 Head SAR >

Mode	Freq. (MHz)	CH	Antenna	Conducted Power (dBm)	Max Allowed Power (dBm)	Scaling Factor	Measured 1g SAR (W/kg)	Reported SAR (W/Kg)	Sum
11b	2437	6	0	18.32	19.5	1.31	**0.589**	**0.773**	1.117
			1	18.25	19.5	1.33	0.258	0.344	
11n HT20	2437	6	0	17.88	19.5	1.45	**0.514**	**0.746**	1.253
			1	18.05	19.5	1.40	0.363	0.507	

< 802.11b/n Body SAR >

Mode	Freq. (MHz)	CH	Antenna	Conducted Power (dBm)	Max Allowed Power (dBm)	Scaling Factor	Measured 1g SAR (W/kg)	Reported SAR (W/Kg)	Sum
11b	2437	6	0	18.32	19.5	1.31	**0.645**	**0.846**	1.082
			1	18.25	19.5	1.33	0.177	0.236	
11n HT20	2437	6	0	17.88	19.5	1.45	**0.719**	**1.044**	**1.399**
			1	18.05	19.5	1.40	0.254	0.355	

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< 802.11a Head SAR >

Mode	Freq. (MHz)	CH	Antenna	Conducted Power (dBm)	Max Allowed Power (dBm)	Scaling Factor	Measured 1g SAR (W/kg)	Reported SAR (W/Kg)	Sum
11a	5180	36	0	11.86	13.5	1.46	0.021	0.030	0.097
			1	12.07	13.5	1.39	**0.048**	**0.067**	
11a	5240	48	0	12.08	13.5	1.39	0.025	0.035	0.077
			1	12.29	13.5	1.32	0.032	0.042	
11a	5260	52	0	15.27	16.5	1.33	0.086	0.115	0.195
			1	15.2	16.5	1.35	0.060	0.080	
11a	5320	64	0	13.93	15.5	1.44	**0.209**	**0.300**	0.387
			1	14.34	15.5	1.31	0.067	0.087	
11a	5520	104	0	14.11	15.5	1.38	**0.020**	**0.027**	0.012
			1	14.51	15.5	1.26	0.001	0.002	
11a	5580	116	0	15.35	16.5	1.30	0.011	0.014	0.112
			1	15.14	16.5	1.37	0.009	0.012	
11a	5620	124	0	15.02	16.5	1.41	0.009	0.013	0.017
			1	15.25	16.5	1.33	0.003	0.004	
11a	5680	136	0	15.12	16.5	1.37	0.008	0.012	0.019
			1	15.21	16.5	1.35	0.005	0.007	
11a	5745	149	0	14.05	15.5	1.40	0.022	0.031	0.046
			1	14.21	15.5	1.35	0.011	0.015	
11a	5785	157	0	14.28	15.5	1.32	0.021	0.028	0.050
			1	14.23	15.5	1.34	0.017	0.022	
11a	5825	165	0	14.01	15.5	1.41	**0.031**	**0.043**	0.060
			1	14.41	15.5	1.29	0.013	0.017	

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< 802.11a Body SAR >

Mode	Freq. (MHz)	CH	Antenna	Conducted Power (dBm)	Max Allowed Power (dBm)	Scaling Factor	Measured 1g SAR (W/kg)	Reported SAR (W/Kg)	Sum
11a	5180	36	0	11.86	13.5	1.46	0.000	0.000	0.167
			1	12.07	13.5	1.39	**0.120**	**0.167**	
11a	5240	48	0	12.08	13.5	1.39	0.031	0.043	0.136
			1	12.29	13.5	1.32	0.070	0.093	
11a	5260	52	0	15.27	16.5	1.33	0.082	0.108	0.240
			1	15.2	16.5	1.35	0.098	0.132	
11a	5320	64	0	13.93	15.5	1.44	**0.259**	**0.372**	0.514
			1	14.34	15.5	1.31	0.109	0.142	
11a	5520	104	0	14.11	15.5	1.38	0.013	0.017	0.031
			1	14.51	15.5	1.26	0.011	0.014	
11a	5580	116	0	15.35	16.5	1.30	0.000	0.000	0.015
			1	15.14	16.5	1.37	0.011	0.015	
11a	5620	124	0	15.02	16.5	1.41	0.011	0.016	0.022
			1	15.25	16.5	1.33	0.005	0.006	
11a	5680	136	0	15.12	16.5	1.37	**0.020**	**0.027**	0.031
			1	15.21	16.5	1.35	0.003	0.004	
11a	5745	149	0	14.05	15.5	1.40	0.022	0.030	0.040
			1	14.21	15.5	1.35	0.007	0.009	
11a	5785	157	0	14.28	15.5	1.32	0.019	0.025	0.046
			1	14.23	15.5	1.34	0.016	0.021	
11a	5825	165	0	14.01	15.5	1.41	**0.029**	**0.040**	0.047
			1	14.41	15.5	1.29	0.005	0.007	

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EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

ANNEX A. SYSTEM VERIFICATION PLOTS

< 2450 MHz Head / Date : May 27, 2014 >

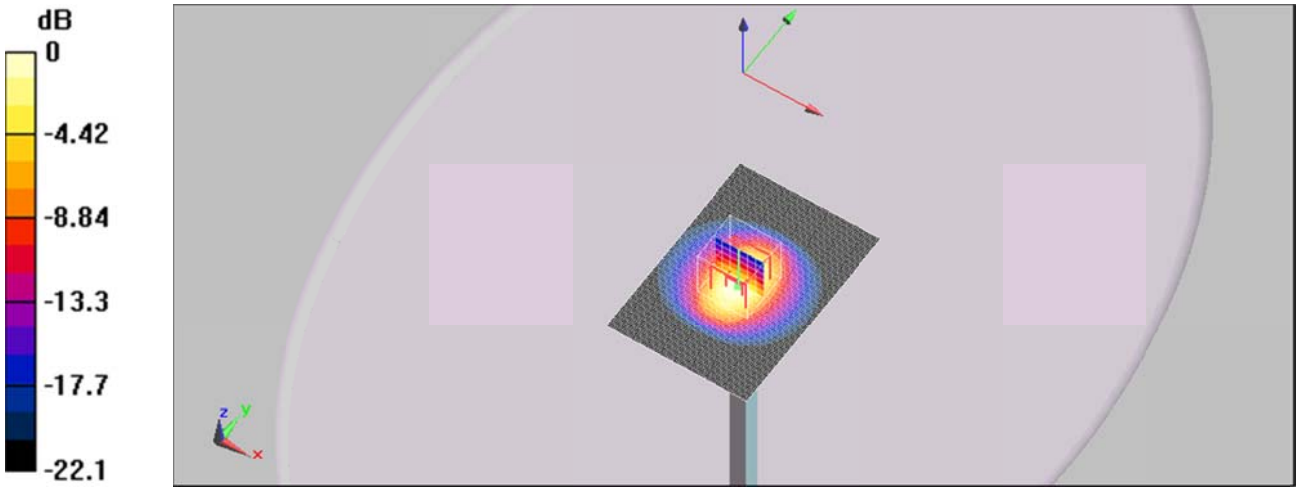
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:923

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.85 mho/m; ε_r = 37.5; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3666; ConvF(7.78, 7.78, 7.78); Calibrated: 2013-11-27
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn444; Calibrated: 2013-11-22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1030
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

2450MHz Head SPC/Area Scan (71x101x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 21.3 mW/g

2450MHz Head SPC/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 107.6 V/m; Power Drift = 0.026 dB
Peak SAR (extrapolated) = 27.9 W/kg
SAR(1 g) = 13.6 mW/g; SAR(10 g) = 6.33 mW/g
Maximum value of SAR (measured) = 20.8 mW/g



0 dB = 20.8mW/g

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EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

< 2450 MHz Body / Date : May 29, 2014 >

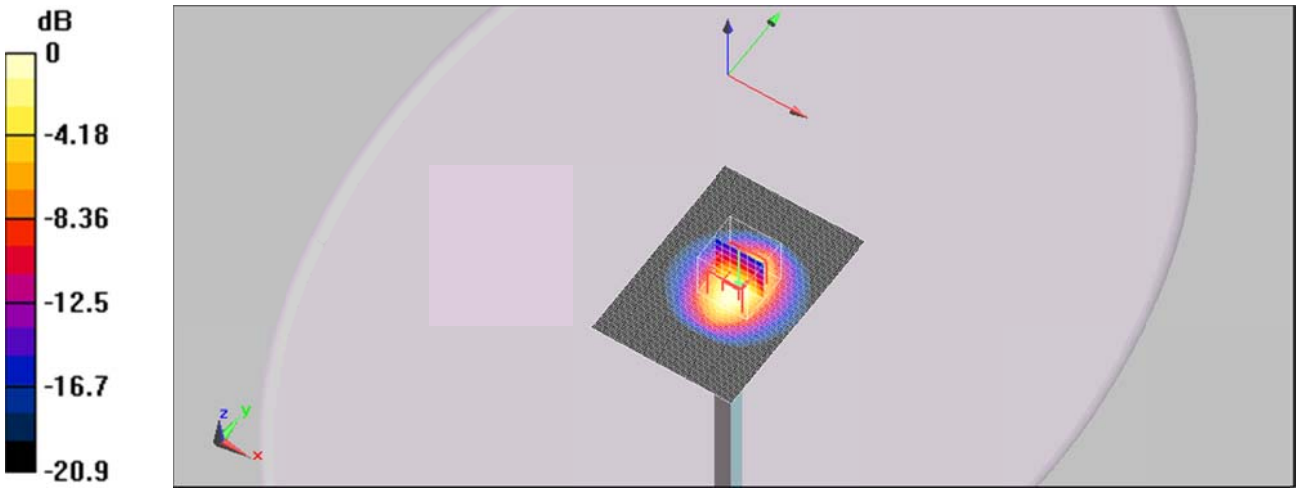
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:923

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.99 mho/m; ε_r = 54.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3666; ConvF(7.45, 7.45, 7.45); Calibrated: 2013-11-27
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn444; Calibrated: 2013-11-22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1030
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

2450MHz Body SPC/Area Scan (71x101x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 20.3 mW/g

2450MHz Body SPC/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 90.2 V/m; Power Drift = -0.071 dB
Peak SAR (extrapolated) = 26.2 W/kg
SAR(1 g) = 13.4 mW/g; SAR(10 g) = 6.36 mW/g
Maximum value of SAR (measured) = 20 mW/g



0 dB = 20mW/g

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< 5200 MHz Head / Date : June 02, 2014 >

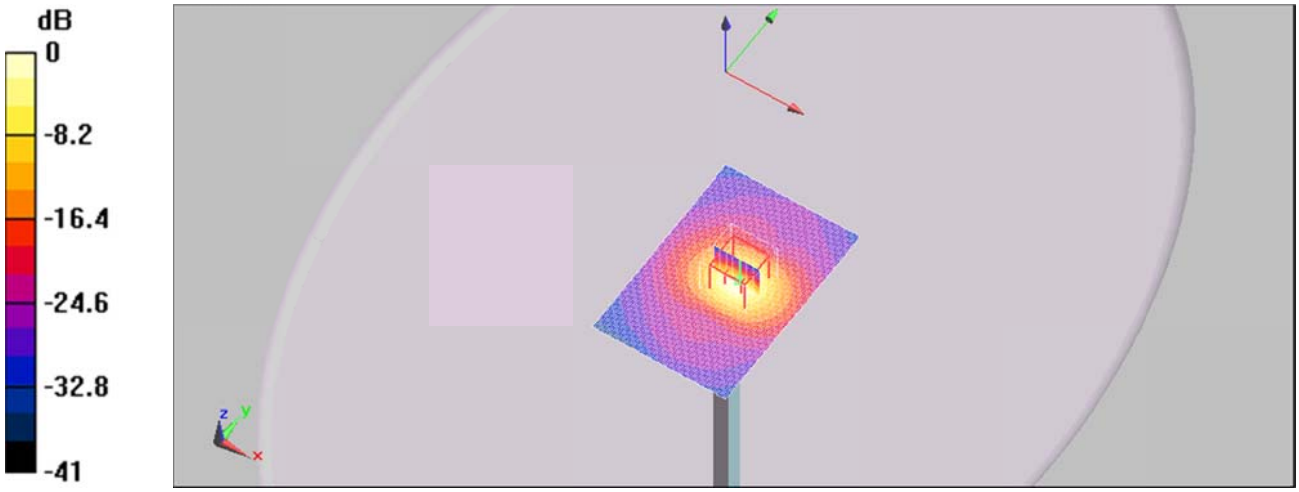
DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN:1094

Communication System: CW; Frequency: 5200 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5200 MHz; σ = 4.59 mho/m; ε_r = 35.2; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3666; ConvF(5.57, 5.57, 5.57); Calibrated: 2013-11-27
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn444; Calibrated: 2013-11-22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1030
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

5200MHz SPC/Area Scan (81x121x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 40.8 mW/g

5200MHz SPC/Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 74.5 V/m; Power Drift = -0.074 dB
Peak SAR (extrapolated) = 77.3 W/kg
SAR(1 g) = 18.4 mW/g; SAR(10 g) = 5.28 mW/g
Maximum value of SAR (measured) = 35.8 mW/g



0 dB = 35.8mW/g

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EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

< 5200 MHz Body / Date : June 16, 2014 >

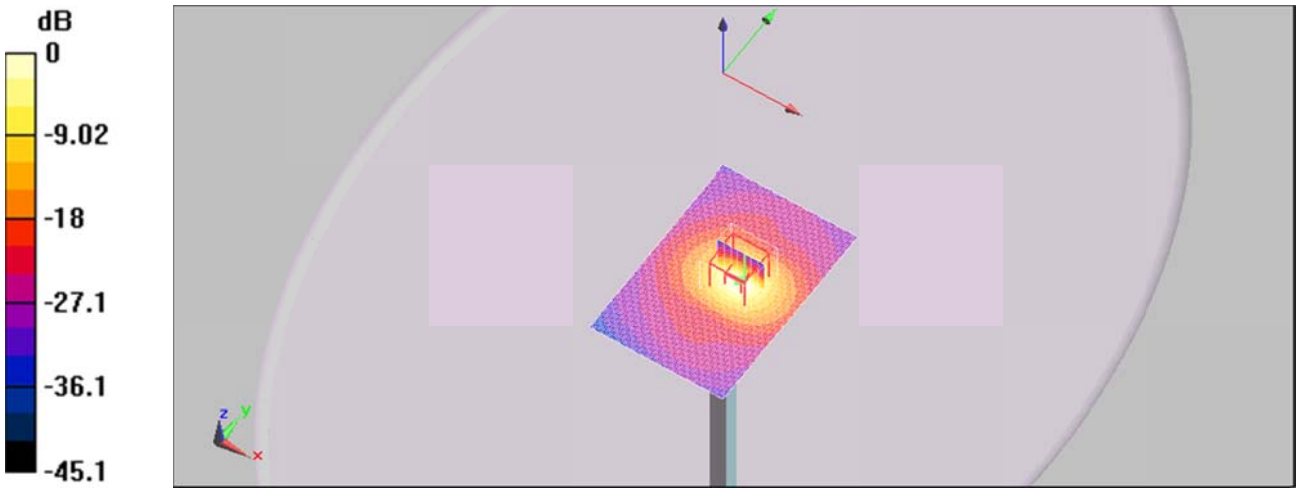
DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN:1094

Communication System: CW; Frequency: 5200 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5200 MHz; σ = 5.52 mho/m; ε_r = 48.2; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3666; ConvF(4.99, 4.99, 4.99); Calibrated: 2013-11-27
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn444; Calibrated: 2013-11-22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1030
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

5200MHz Body SPC/Area Scan (81x121x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 39.6 mW/g

5200MHz Body SPC/Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 60 V/m; Power Drift = -0.209 dB
Peak SAR (extrapolated) = 75.8 W/kg
SAR(1 g) = 17.7 mW/g; SAR(10 g) = 4.98 mW/g
Maximum value of SAR (measured) = 34.1 mW/g



0 dB = 34.1mW/g

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EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

< 5300 MHz Head / Date : June 09, 2014 >

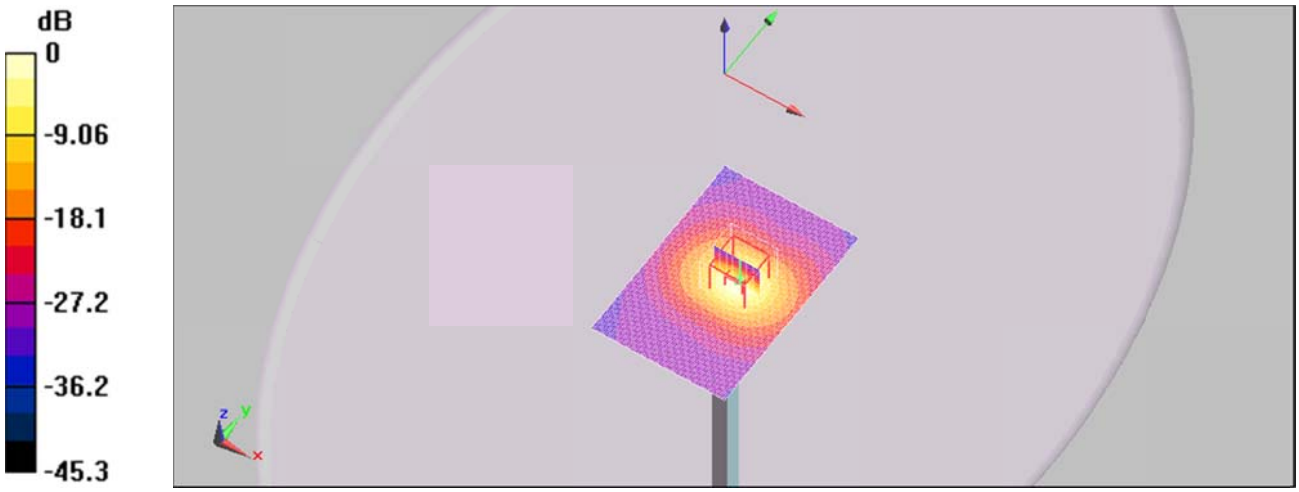
DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN:1094

Communication System: CW; Frequency: 5300 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5300 MHz; σ = 4.7 mho/m; ε_r = 35.4; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3666; ConvF(5.41, 5.41, 5.41); Calibrated: 2013-11-27
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn444; Calibrated: 2013-11-22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1030
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

5300MHz Head SPC/Area Scan (81x121x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 44.5 mW/g

5300MHz Head SPC/Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 75.3 V/m; Power Drift = -0.204 dB
Peak SAR (extrapolated) = 87.2 W/kg
SAR(1 g) = 20.4 mW/g; SAR(10 g) = 5.9 mW/g
Maximum value of SAR (measured) = 40.5 mW/g



0 dB = 40.5mW/g

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EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

< 5300 MHz Body Date : June 17, 2014 >

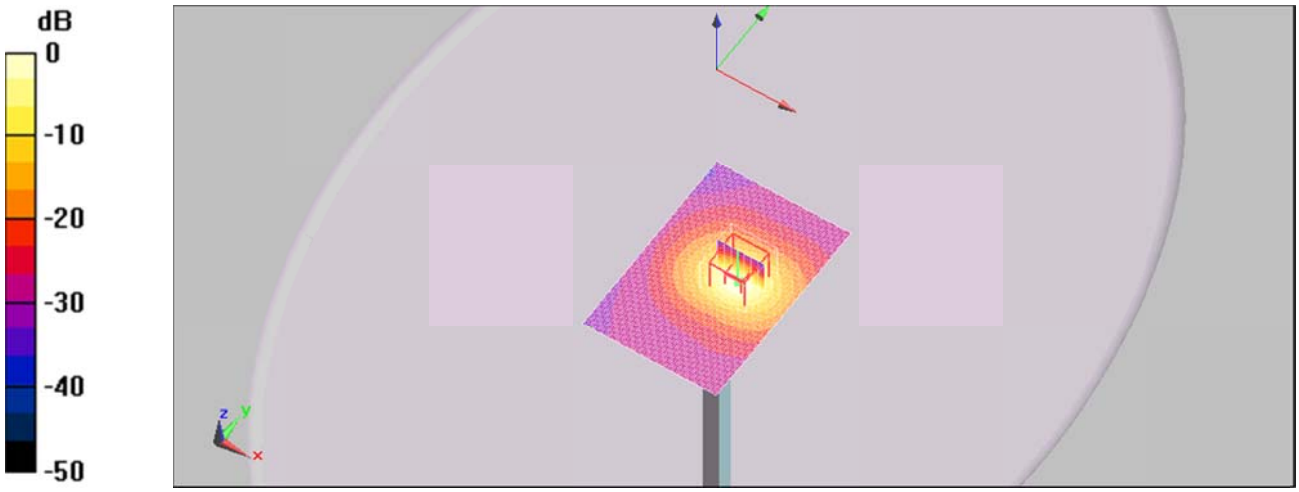
DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN:1094

Communication System: CW; Frequency: 5300 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5300 MHz; σ = 5.56 mho/m; ε_r = 47.4; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3666; ConvF(4.68, 4.68, 4.68); Calibrated: 2013-11-27
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn444; Calibrated: 2013-11-22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1030
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

5300MHz Body SPC/Area Scan (81x121x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 39.7 mW/g

5300MHz Body SPC/Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 46.9 V/m; Power Drift = -0.119 dB
Peak SAR (extrapolated) = 78.9 W/kg
SAR(1 g) = 18.1 mW/g; SAR(10 g) = 5.12 mW/g
Maximum value of SAR (measured) = 35.3 mW/g



0 dB = 35.3mW/g

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EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

< 5600 MHz Head / Date : June 11, 2014 >

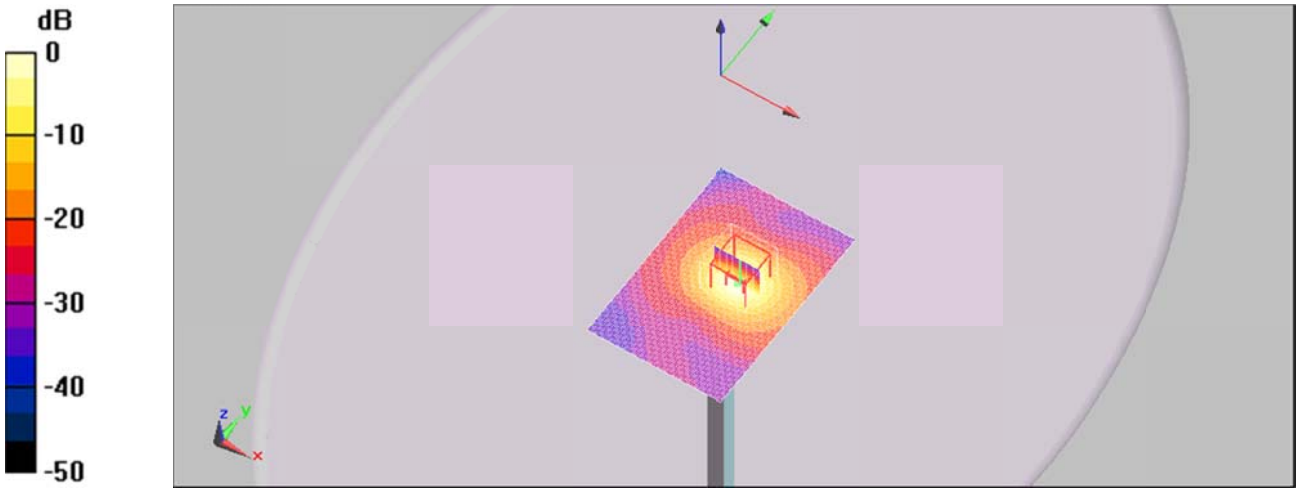
DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN:1094

Communication System: CW; Frequency: 5600 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5600 MHz; σ = 5.06 mho/m; ε_r = 34.4; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3666; ConvF(4.91, 4.91, 4.91); Calibrated: 2013-11-27
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn444; Calibrated: 2013-11-22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1030
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

5600MHz SPC/Area Scan (81x121x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 43.4 mW/g

5600MHz SPC/Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 58.6 V/m; Power Drift = -0.157 dB
Peak SAR (extrapolated) = 88.7 W/kg
SAR(1 g) = 20.1 mW/g; SAR(10 g) = 5.73 mW/g
Maximum value of SAR (measured) = 39.5 mW/g



0 dB = 39.5mW/g

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EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

< 5600 MHz Body / Date : June 14, 2014 >

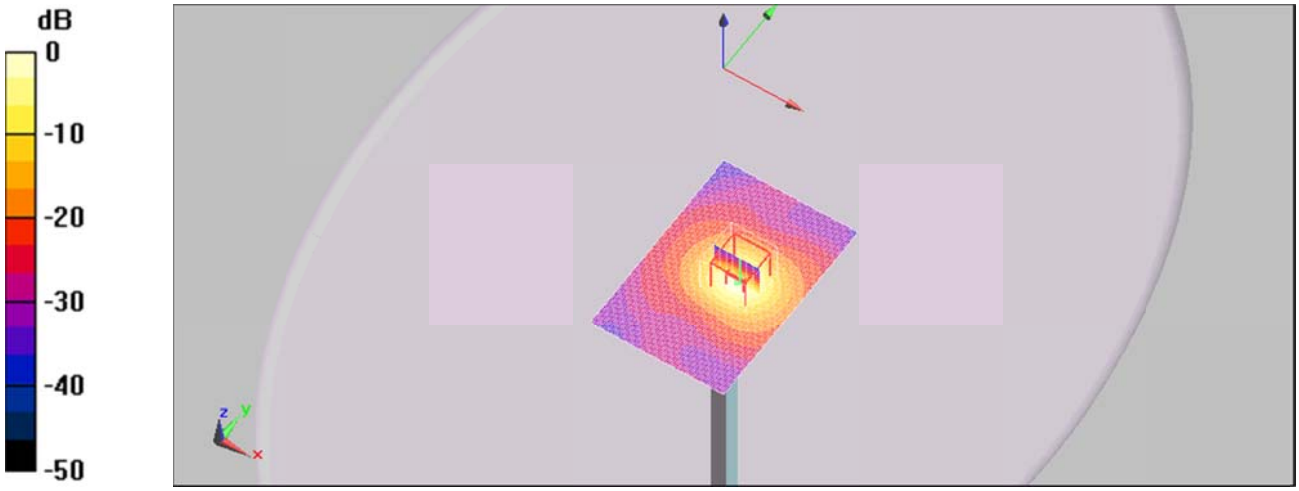
DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN:1094

Communication System: CW; Frequency: 5600 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5600 MHz; σ = 5.98 mho/m; ε_r = 48; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3666; ConvF(4.2, 4.2, 4.2); Calibrated: 2013-11-27
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn444; Calibrated: 2013-11-22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1030
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

5600MHz Body SPC/Area Scan (81x121x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 44 mW/g

5600MHz Body SPC/Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 62.9 V/m; Power Drift = -0.179 dB
Peak SAR (extrapolated) = 90.1 W/kg
SAR(1 g) = 20.2 mW/g; SAR(10 g) = 5.65 mW/g
Maximum value of SAR (measured) = 39.9 mW/g



0 dB = 39.9mW/g

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< 5800 MHz Head / Date : June 12, 2014 >

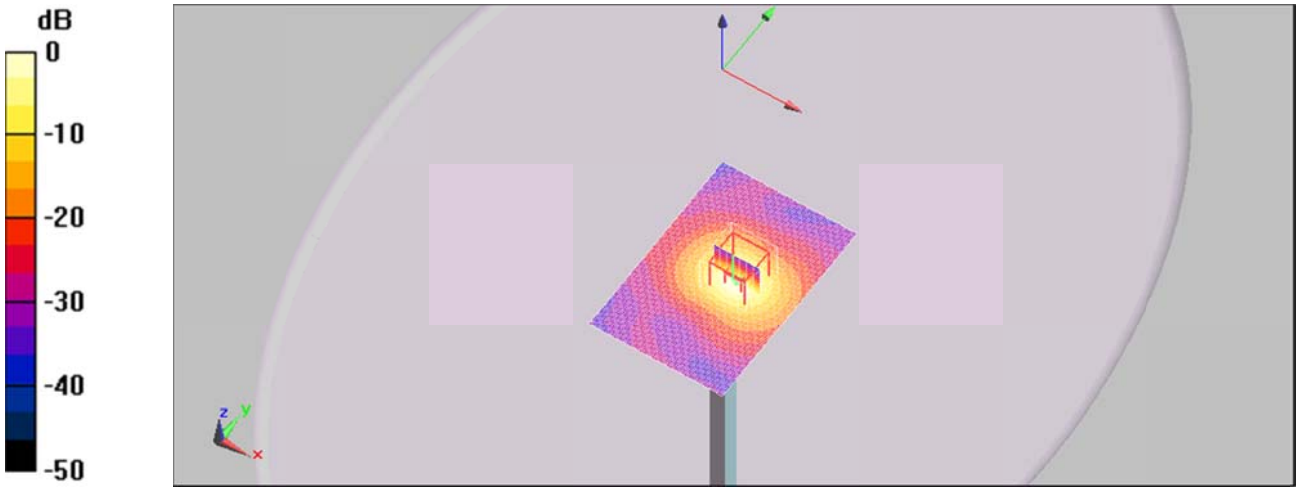
DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN:1094

Communication System: CW; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5800 MHz; σ = 5.2 mho/m; ε_r = 34.2; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3666; ConvF(4.97, 4.97, 4.97); Calibrated: 2013-11-27
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn444; Calibrated: 2013-11-22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1030
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

5800MHz Head SPC/Area Scan (81x121x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 41.7 mW/g

5800MHz Head SPC/Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 67.9 V/m; Power Drift = -0.228 dB
Peak SAR (extrapolated) = 85.4 W/kg
SAR(1 g) = 19 mW/g; SAR(10 g) = 5.39 mW/g
Maximum value of SAR (measured) = 37.5 mW/g



0 dB = 37.5mW/g

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

< 5800 MHz Body / June 13, 2014 >

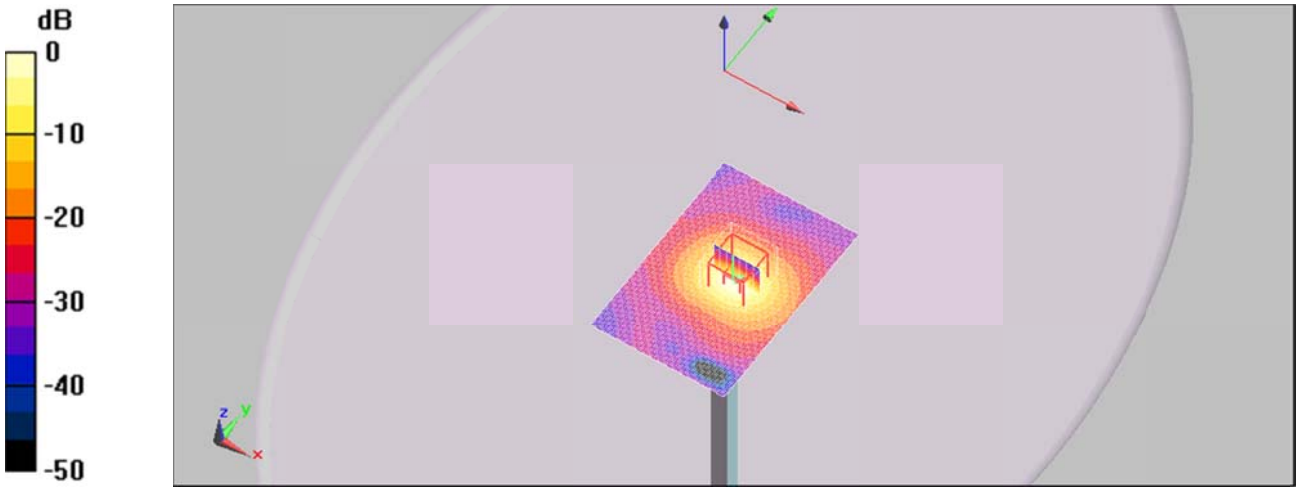
DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN:1094

Communication System: CW; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5800 MHz; σ = 6.26 mho/m; ε_r = 47.2; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3666; ConvF(4.68, 4.68, 4.68); Calibrated: 2013-11-27
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn444; Calibrated: 2013-11-22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1030
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

5800MHz SPC/Area Scan (81x121x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 41 mW/g

5800MHz SPC/Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 68.8 V/m; Power Drift = -0.343 dB
Peak SAR (extrapolated) = 88.7 W/kg
SAR(1 g) = 19.1 mW/g; SAR(10 g) = 5.32 mW/g
Maximum value of SAR (measured) = 38.7 mW/g



0 dB = 38.7mW/g

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

ANNEX B. SAR TEST PLOTS

< 802.11b CH6 1Mbps Head / Date : May 27, 2014 >

DUT: S4343W; Type: Sample; Serial: Not Specified

Communication System: 802.11 b/g/n; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.84 mho/m; ε_r = 37.5; ρ = 1000 kg/m^3
Phantom section: Flat Section

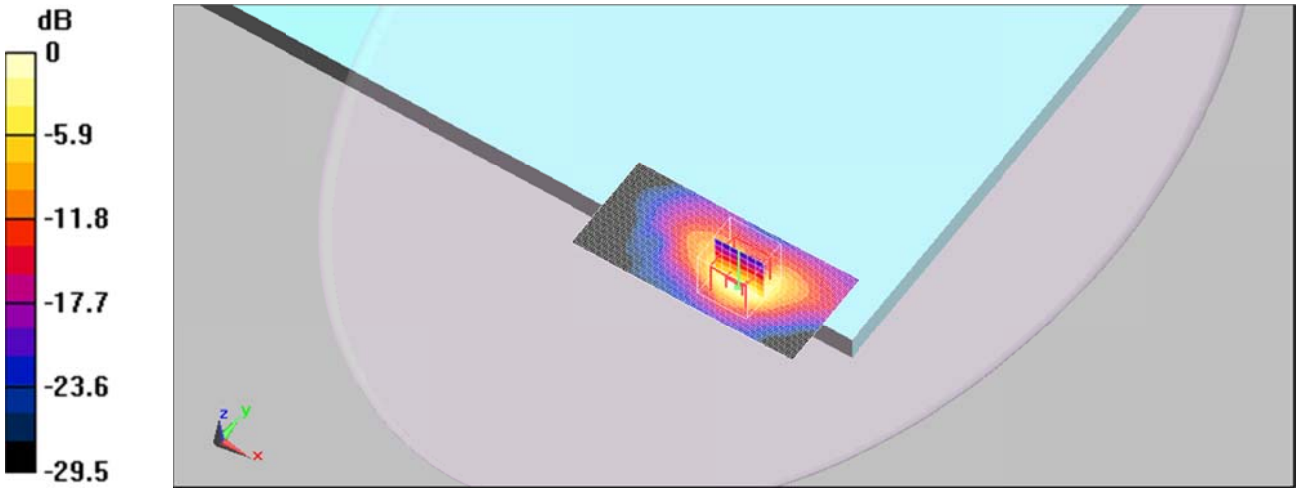
DASY5 Configuration:
- Probe: EX3DV4 - SN3666; ConvF(7.78, 7.78, 7.78); Calibrated: 2013-11-27
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn444; Calibrated: 2013-11-22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1030
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

802.11b_ch6_2437MHz_1Mbps_Head_Ant 0/Area Scan (111x51x1):
Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (interpolated) = 0.949 mW/g

802.11b_ch6_2437MHz_1Mbps_Head_Ant 0/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.4 V/m; Power Drift = 0.206 dB
Peak SAR (extrapolated) = 1.77 W/kg
SAR(1 g) = 0.589 mW/g; SAR(10 g) = 0.213 mW/g

Maximum value of SAR (measured) = 0.948 mW/g



0 dB = 0.948mW/g

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

< 802.11n_HT20 CH6 MCS0 Head / Date : May 27, 2014 >

DUT: S4343W; Type: Sample; Serial: Not Specified

Communication System: 802.11 b/g/n; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.84 mho/m; ε_r = 37.5; ρ = 1000 kg/m^3
Phantom section: Flat Section

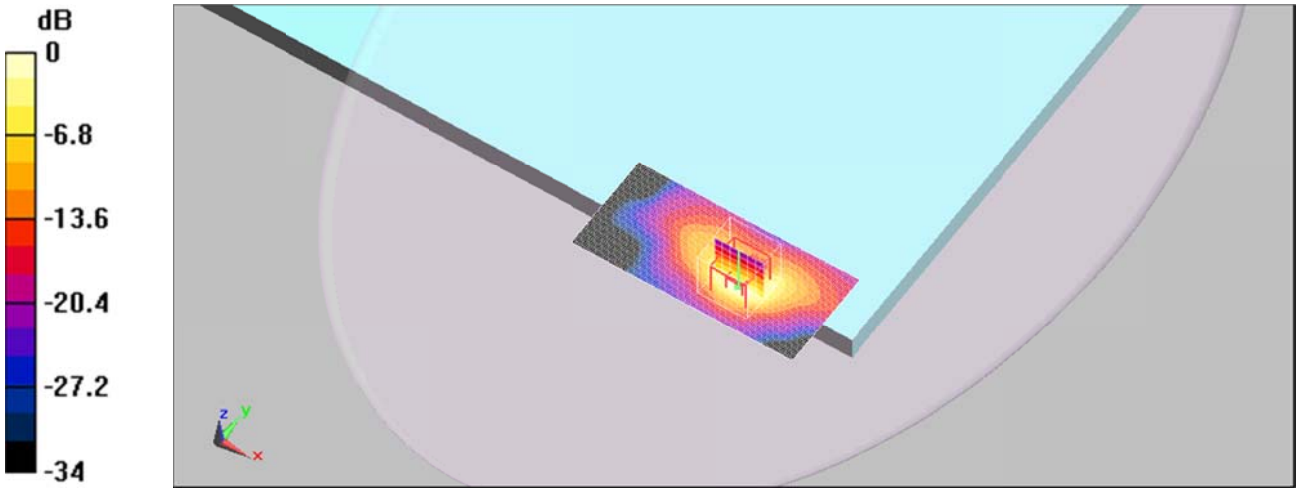
DASY5 Configuration:
- Probe: EX3DV4 - SN3666; ConvF(7.78, 7.78, 7.78); Calibrated: 2013-11-27
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn444; Calibrated: 2013-11-22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1030
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

802.11n_HT20_ch6_2437MHz_MCS0_Head_Ant 0/Area Scan (111x51x1):

Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.841 mW/g

802.11n_HT20_ch6_2437MHz_MCS0_Head_Ant 0/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 13.6 V/m; Power Drift = 0.099 dB
Peak SAR (extrapolated) = 1.56 W/kg
SAR(1 g) = 0.514 mW/g; SAR(10 g) = 0.187 mW/g
Maximum value of SAR (measured) = 0.831 mW/g



0 dB = 0.831mW/g

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

< 802.11a CH36 6Mbps Head / Date : June 02, 2014 >

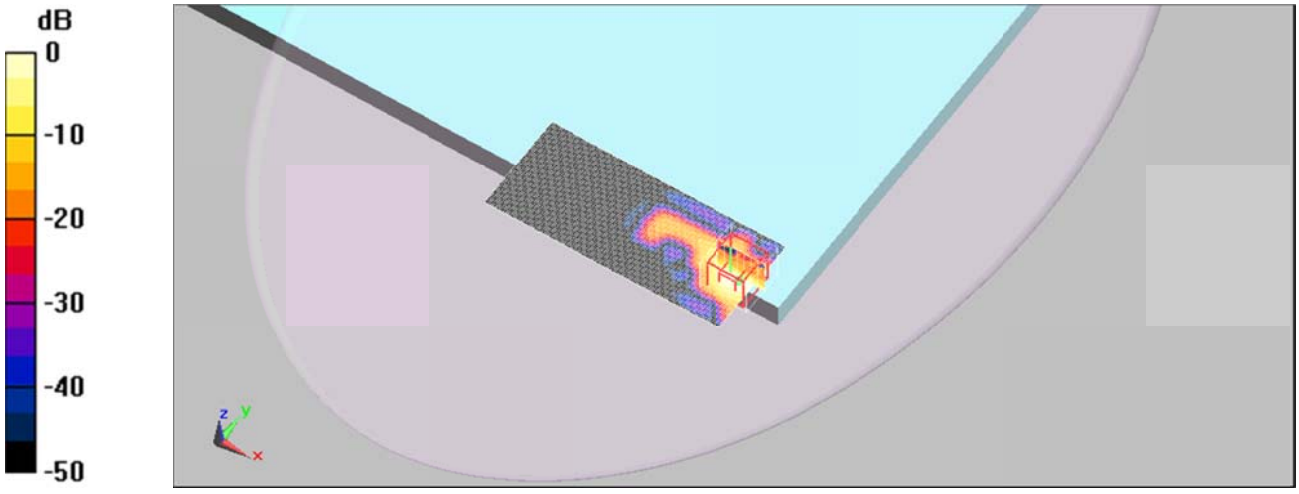
DUT: S4343W; Type: Sample; Serial: Not Specified

Communication System: 802.11a; Frequency: 5180 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5180 MHz; σ = 4.57 mho/m; ε_r = 35.2; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3666; ConvF(5.57, 5.57, 5.57); Calibrated: 2013-11-27
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn444; Calibrated: 2013-11-22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1030
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

802.11a_ch36_5180MHz_6Mbps_Head_Ant 1/Area Scan (141x61x1):
Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.118 mW/g

802.11a_ch36_5180MHz_6Mbps_Head_Ant 1/Zoom Scan (8x8x12)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 2.47 V/m; Power Drift = -0.389 dB
Peak SAR (extrapolated) = 0.223 W/kg
SAR(1 g) = 0.048 mW/g; SAR(10 g) = 0.012 mW/g
Maximum value of SAR (measured) = 0.112 mW/g



0 dB = 0.112mW/g

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EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

< 802.11a CH64 6Mbps Head / Date : June 09, 2014 >

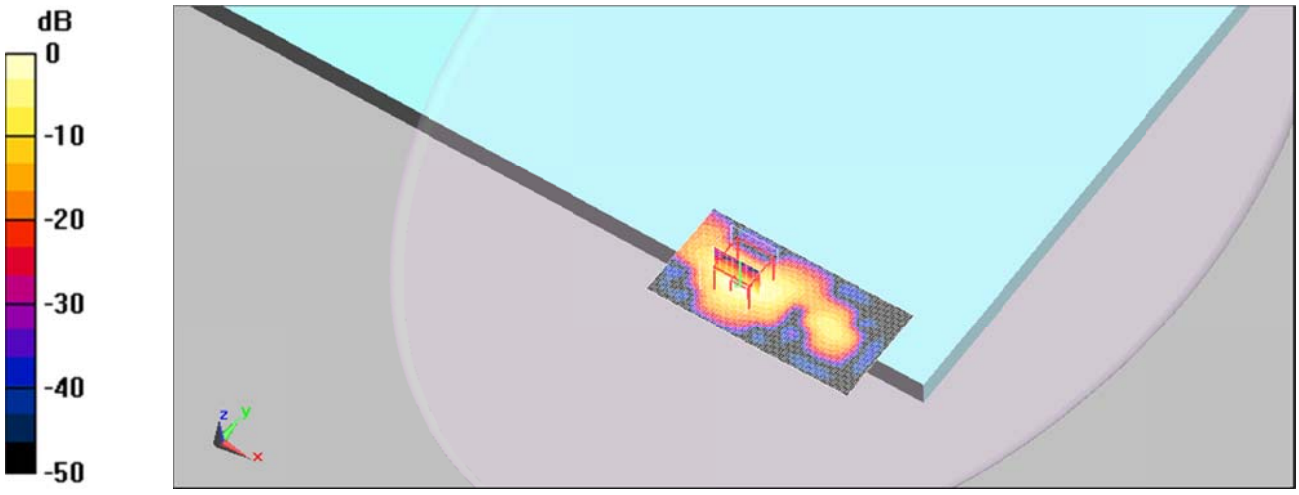
DUT: S4343W; Type: Sample; Serial: Not Specified

Communication System: 802.11a; Frequency: 5320 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5320 MHz; σ = 4.73 mho/m; ε_r = 35.4; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3666; ConvF(5.41, 5.41, 5.41); Calibrated: 2013-11-27
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn444; Calibrated: 2013-11-22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1030
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

802.11a_ch64_5320MHz_6Mbps_Head_Ant 0/Area Scan (121x61x1):
Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.391 mW/g

802.11a_ch64_5320MHz_6Mbps_Head_Ant 0/Zoom Scan (8x8x12)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 4.71 V/m; Power Drift = 0.266 dB
Peak SAR (extrapolated) = 1.67 W/kg
SAR(1 g) = 0.209 mW/g; SAR(10 g) = 0.056 mW/g
Maximum value of SAR (measured) = 0.459 mW/g



0 dB = 0.459mW/g

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EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

< 802.11a CH104 6Mbps Head / Date : June 11, 2014 >

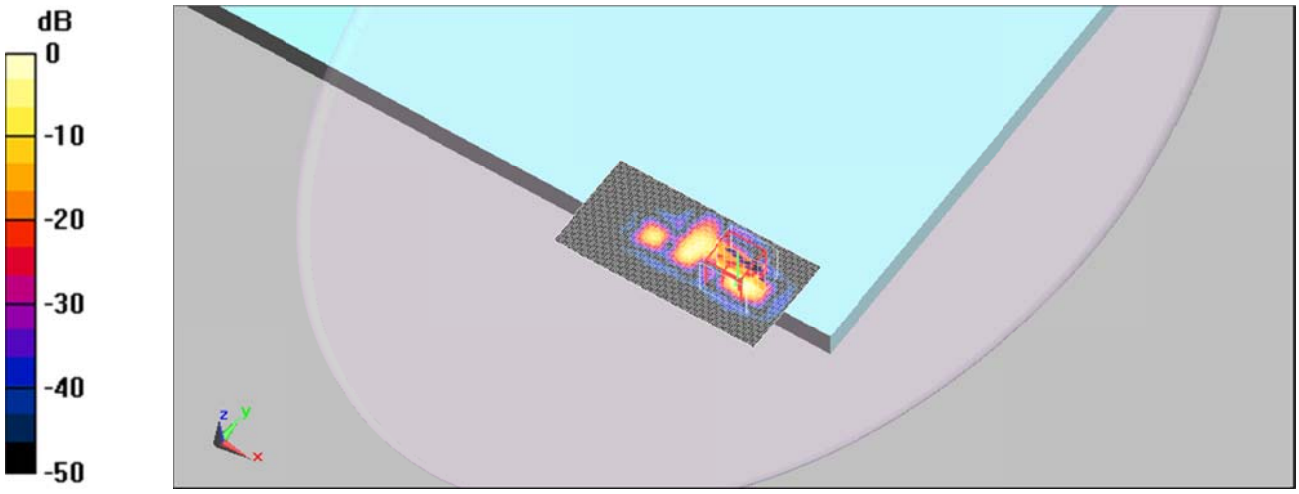
DUT: S4343W; Type: Sample; Serial: Not Specified

Communication System: 802.11a; Frequency: 5520 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5520 MHz; σ = 4.99 mho/m; ε_r = 34.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3666; ConvF(5.09, 5.09, 5.09); Calibrated: 2013-11-27
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn444; Calibrated: 2013-11-22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1030
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

802.11a_ch104_5520MHz_6Mbps_Head_Ant 0/Area Scan (121x61x1):
Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.058 mW/g

802.11a_ch104_5520MHz_6Mbps_Head_Ant 0/Zoom Scan (8x8x12)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 1.83 V/m; Power Drift = -0.131 dB
Peak SAR (extrapolated) = 0.139 W/kg
SAR(1 g) = 0.019 mW/g; SAR(10 g) = 0.00316 mW/g
Maximum value of SAR (measured) = 0.064 mW/g



0 dB = 0.064mW/g

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

< 802.11a CH165 6Mbps Head / Date : June 12, 2014 >

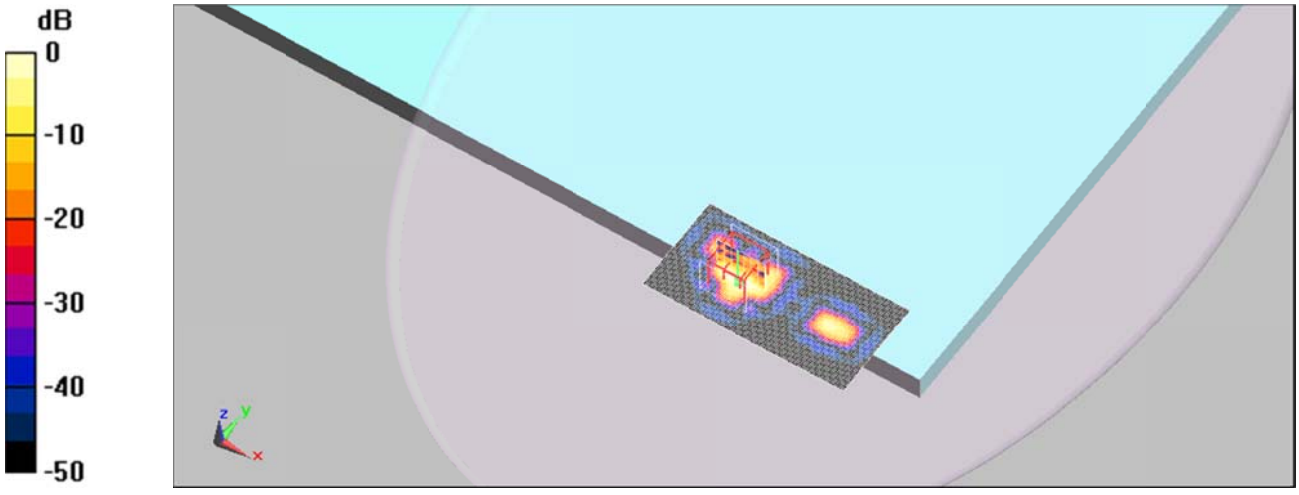
DUT: S4343W; Type: Sample; Serial: Not Specified

Communication System: 802.11a; Frequency: 5825 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5825 MHz; σ = 5.21 mho/m; ε_r = 34.2; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3666; ConvF(4.97, 4.97, 4.97); Calibrated: 2013-11-27
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn444; Calibrated: 2013-11-22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1030
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

802.11a_ch165_5825MHz_6Mbps_Head_Ant 0/Area Scan (121x61x1):
Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.073 mW/g

802.11a_ch165_5825MHz_6Mbps_Head_Ant 0/Zoom Scan (8x8x12)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 1.32 V/m; Power Drift = 0.342 dB
Peak SAR (extrapolated) = 0.144 W/kg
SAR(1 g) = 0.031 mW/g; SAR(10 g) = 0.00707 mW/g
Maximum value of SAR (measured) = 0.071 mW/g



0 dB = 0.071mW/g

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EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

< 802.11b CH6 1Mbps Body / Date : May 29, 2014 >

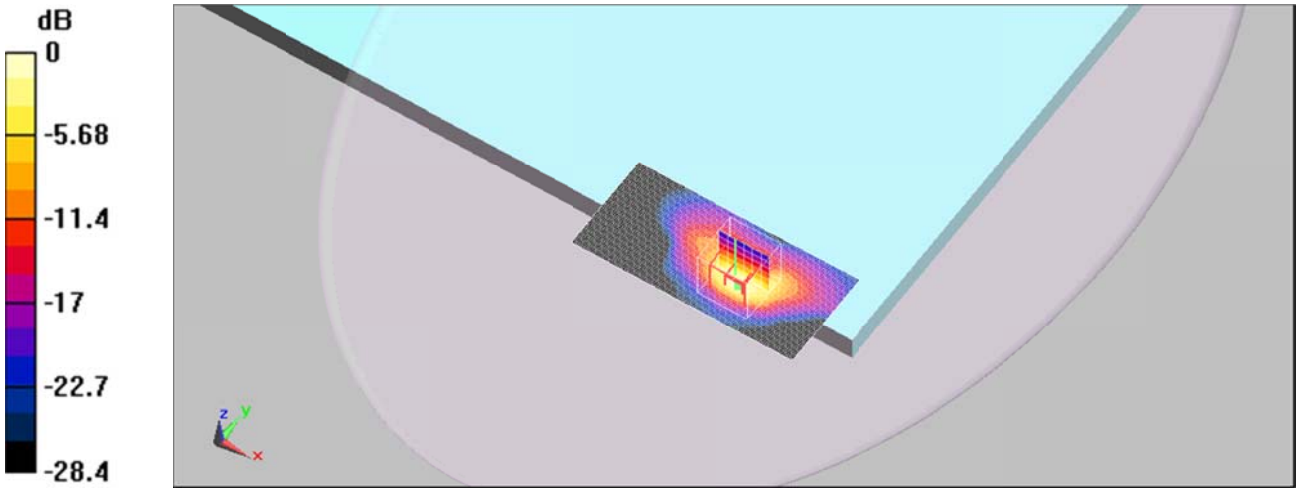
DUT: S4343W; Type: Sample; Serial: Not Specified

Communication System: 802.11 b/g/n; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.97 mho/m; ε_r = 54.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3666; ConvF(7.45, 7.45, 7.45); Calibrated: 2013-11-27
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn444; Calibrated: 2013-11-22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1030
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

802.11b_ch6_2437MHz_1Mbps_Body_Ant 0/Area Scan (111x51x1):
Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.951 mW/g

802.11b_ch6_2437MHz_1Mbps_Body_Ant 0/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.6 V/m; Power Drift = 0.100 dB
Peak SAR (extrapolated) = 1.95 W/kg
SAR(1 g) = 0.645 mW/g; SAR(10 g) = 0.228 mW/g
Maximum value of SAR (measured) = 1.12 mW/g



0 dB = 1.12mW/g

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

< 802.11n_HT20 CH6 MCS0 Body / Date : May 29, 2014 >

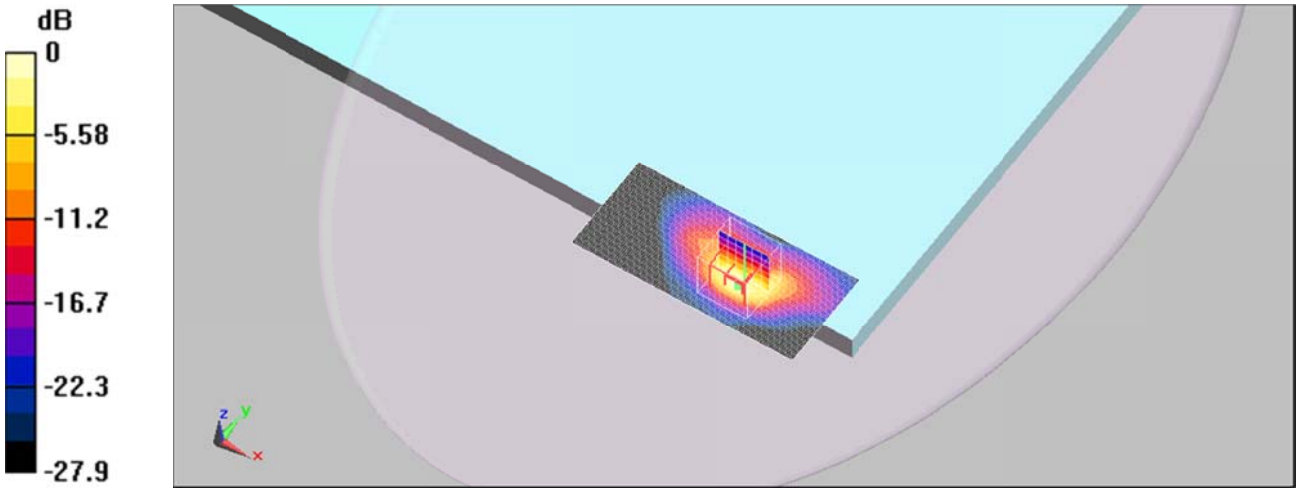
DUT: S4343W; Type: Sample; Serial: Not Specified

Communication System: 802.11 b/g/n; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.97 mho/m; ε_r = 54.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3666; ConvF(7.45, 7.45, 7.45); Calibrated: 2013-11-27
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn444; Calibrated: 2013-11-22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1030
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

802.11n20_ch6_2437MHz_MCS0_Body_Ant 0/Area Scan (111x51x1):
Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 1.06 mW/g

802.11n20_ch6_2437MHz_MCS0_Body_Ant 0/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.1 V/m; Power Drift = 0.160 dB
Peak SAR (extrapolated) = 2.18 W/kg
SAR(1 g) = 0.719 mW/g; SAR(10 g) = 0.254 mW/g
Maximum value of SAR (measured) = 1.25 mW/g



0 dB = 1.25mW/g

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

< 802.11a CH36 6Mbps Body / Date : June 16, 2014 >

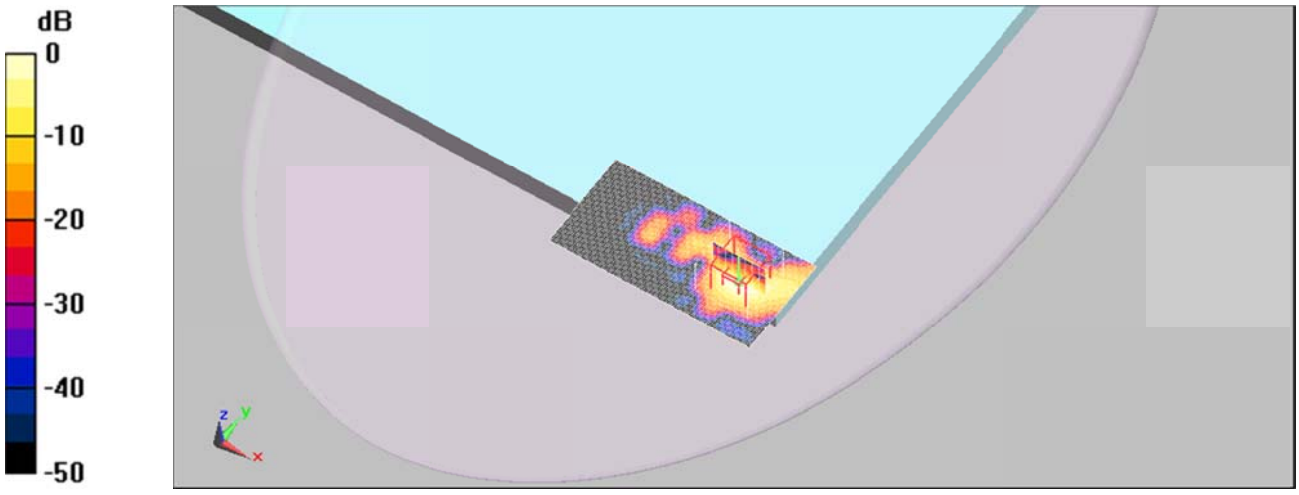
DUT: S4343W; Type: Sample; Serial: Not Specified

Communication System: 802.11a; Frequency: 5180 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5180 MHz; σ = 5.49 mho/m; ε_r = 48.3; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3666; ConvF(4.99, 4.99, 4.99); Calibrated: 2013-11-27
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn444; Calibrated: 2013-11-22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1030
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

802.11a_ch36_5180MHz_6Mbps_Body_Ant 1/Area Scan (121x61x1):
Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.339 mW/g

802.11a_ch36_5180MHz_6Mbps_Body_Ant 1/Zoom Scan (9x9x12)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 3.41 V/m; Power Drift = -0.289 dB
Peak SAR (extrapolated) = 0.742 W/kg
SAR(1 g) = 0.120 mW/g; SAR(10 g) = 0.031 mW/g
Maximum value of SAR (measured) = 0.308 mW/g



0 dB = 0.308mW/g

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

< 802.11a CH64 6Mbps Body / Date : June 17, 2014 >

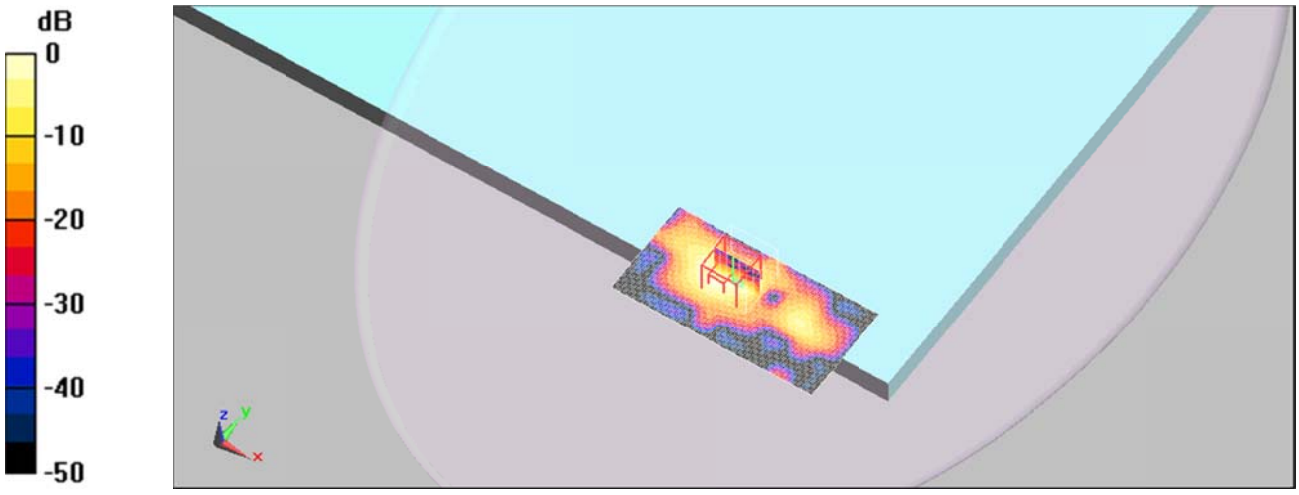
DUT: S4343W; Type: Sample; Serial: Not Specified

Communication System: 802.11a; Frequency: 5320 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5320 MHz; σ = 5.58 mho/m; ε_r = 47.4; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3666; ConvF(4.68, 4.68, 4.68); Calibrated: 2013-11-27
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn444; Calibrated: 2013-11-22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1030
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

802.11a_ch64_5320MHz_6Mbps_Body_Ant 0/Area Scan (121x61x1):
Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.388 mW/g

802.11a_ch64_5320MHz_6Mbps_Body_Ant 0/Zoom Scan (8x8x12)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 5.77 V/m; Power Drift = -0.076 dB
Peak SAR (extrapolated) = 2.15 W/kg
SAR(1 g) = 0.259 mW/g; SAR(10 g) = 0.058 mW/g
Maximum value of SAR (measured) = 0.586 mW/g



0 dB = 0.586mW/g

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

< 802.11a CH136 6Mbps Body / June 14, 2014 >

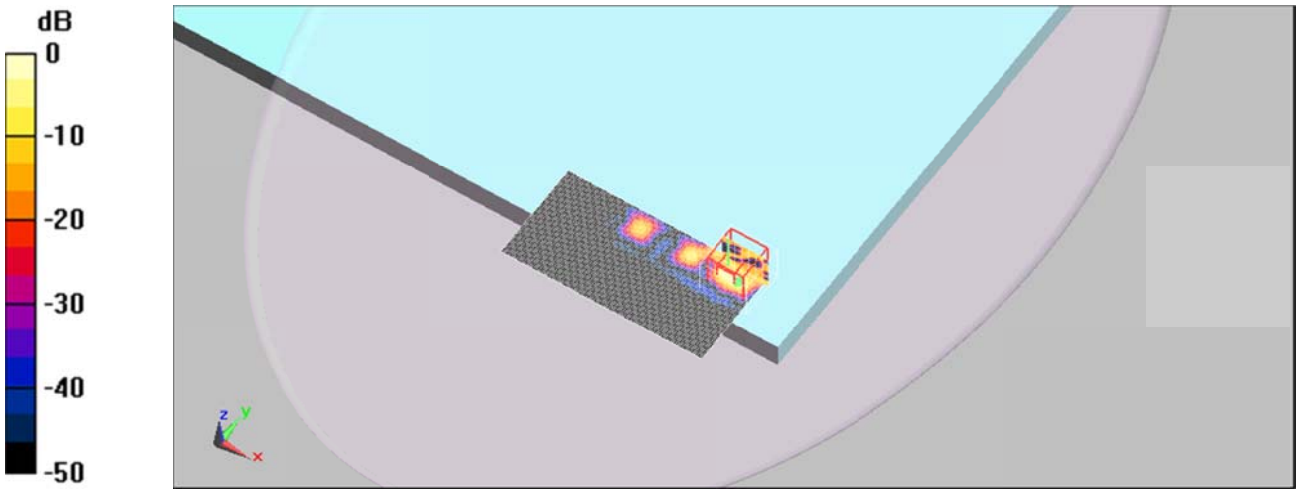
DUT: S4343W; Type: Sample; Serial: Not Specified

Communication System: 802.11a; Frequency: 5680 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5680 MHz; σ = 6.05 mho/m; ε_r = 47.4; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3666; ConvF(4.2, 4.2, 4.2); Calibrated: 2013-11-27
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn444; Calibrated: 2013-11-22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1030
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

802.11a_ch136_5680MHz_6Mbps_Body_Ant 0/Area Scan (121x61x1):
Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.040 mW/g

802.11a_ch136_5680MHz_6Mbps_Body_Ant 0/Zoom Scan (8x8x12)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 1.47 V/m; Power Drift = 3.13 dB
Peak SAR (extrapolated) = 0.134 W/kg
SAR(1 g) = 0.020 mW/g; SAR(10 g) = 0.00414 mW/g
Maximum value of SAR (measured) = 0.066 mW/g



0 dB = 0.066mW/g

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

< 802.11a CH165 6Mbps Body / Date : June 13, 2014 >

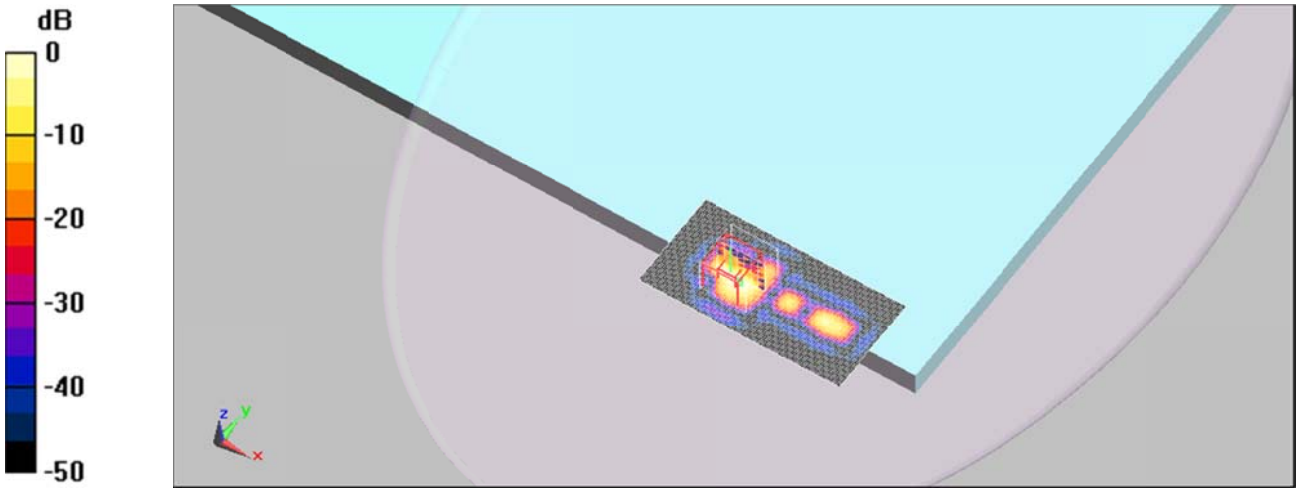
DUT: S4343W; Type: Sample; Serial: Not Specified

Communication System: 802.11a; Frequency: 5825 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5825 MHz; σ = 6.3 mho/m; ε_r = 47.2; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3666; ConvF(4.68, 4.68, 4.68); Calibrated: 2013-11-27
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn444; Calibrated: 2013-11-22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1030
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

802.11a_ch165_5825MHz_6Mbps_Body_Ant 0/Area Scan (121x61x1):
Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.105 mW/g

802.11a_ch165_5825MHz_6Mbps_Body_Ant 0/Zoom Scan (8x8x12)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 1.47 V/m; Power Drift = 1.78 dB
Peak SAR (extrapolated) = 0.140 W/kg
SAR(1 g) = 0.029 mW/g; SAR(10 g) = 0.00652 mW/g
Maximum value of SAR (measured) = 0.080 mW/g



0 dB = 0.080mW/g

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

ANNEX C. PHOTOGRAPHS

< System Verification >

< Test position >

Front view of Ant 0 (front of DUT)

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

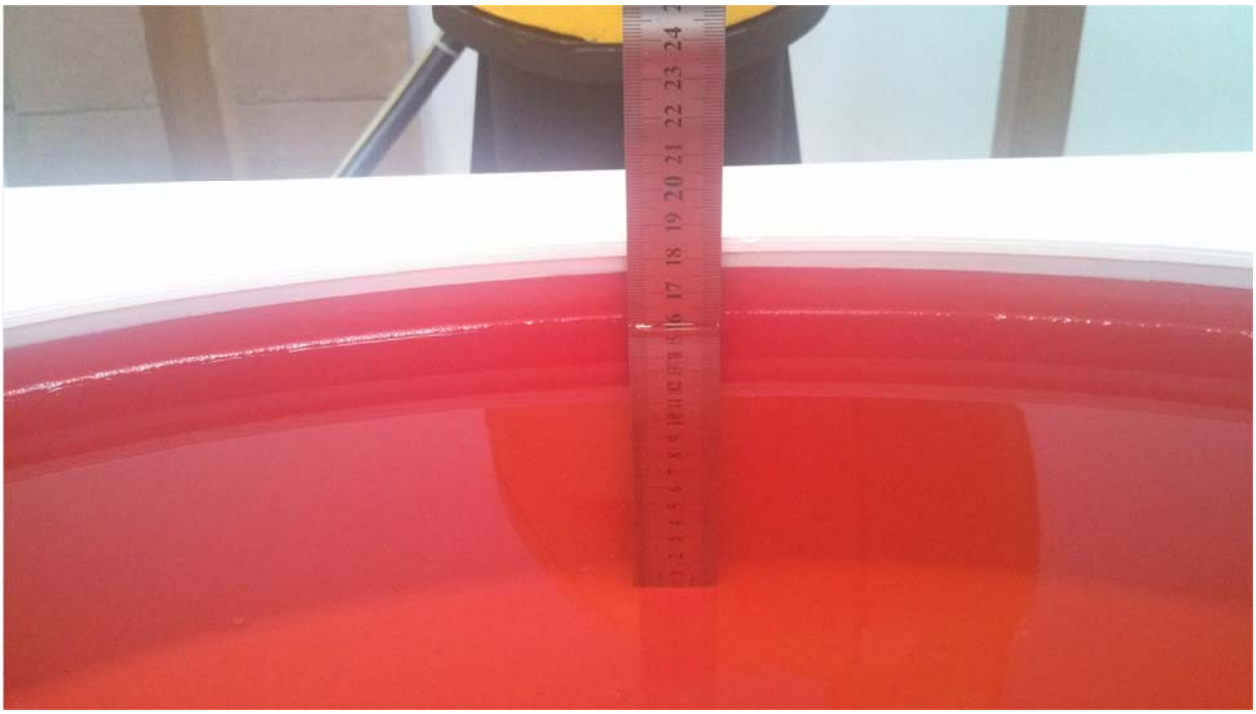
Side view of Ant 0 (front of DUT)

Front view of Ant 1 (front of DUT)

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

Side view of Ant 1 (front of DUT)

< Liquid Depth >



2.4GHz

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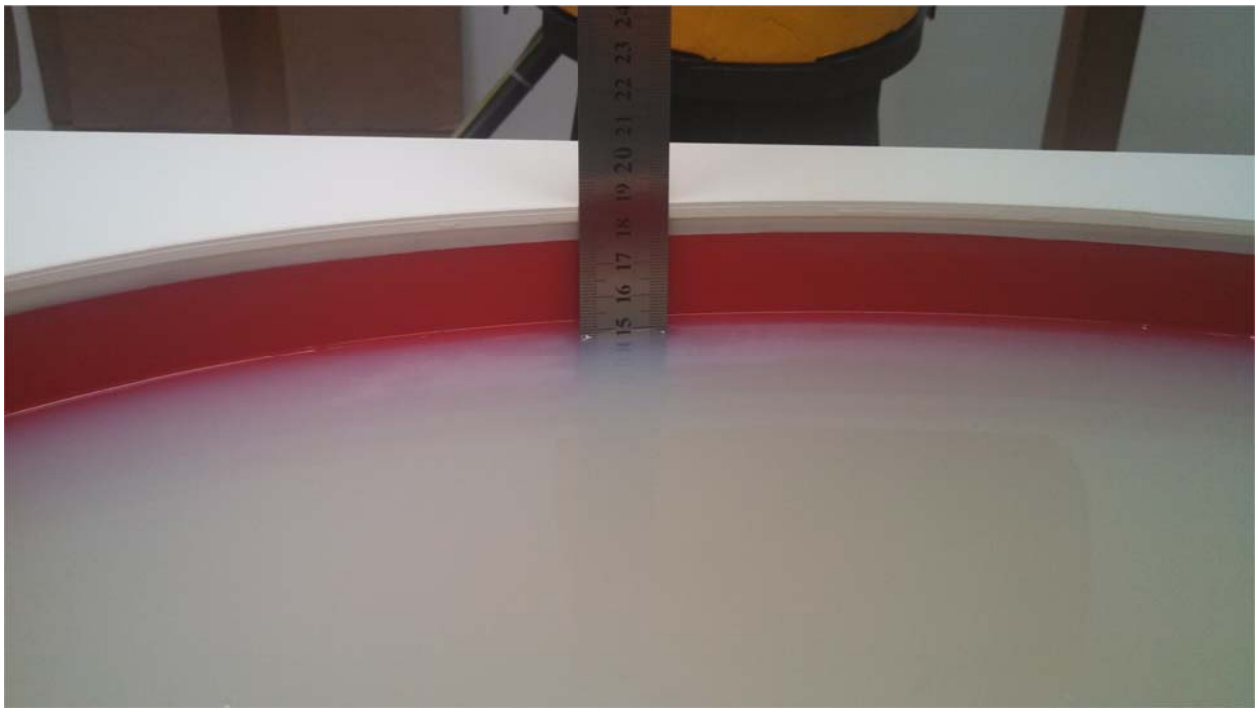

5GHz

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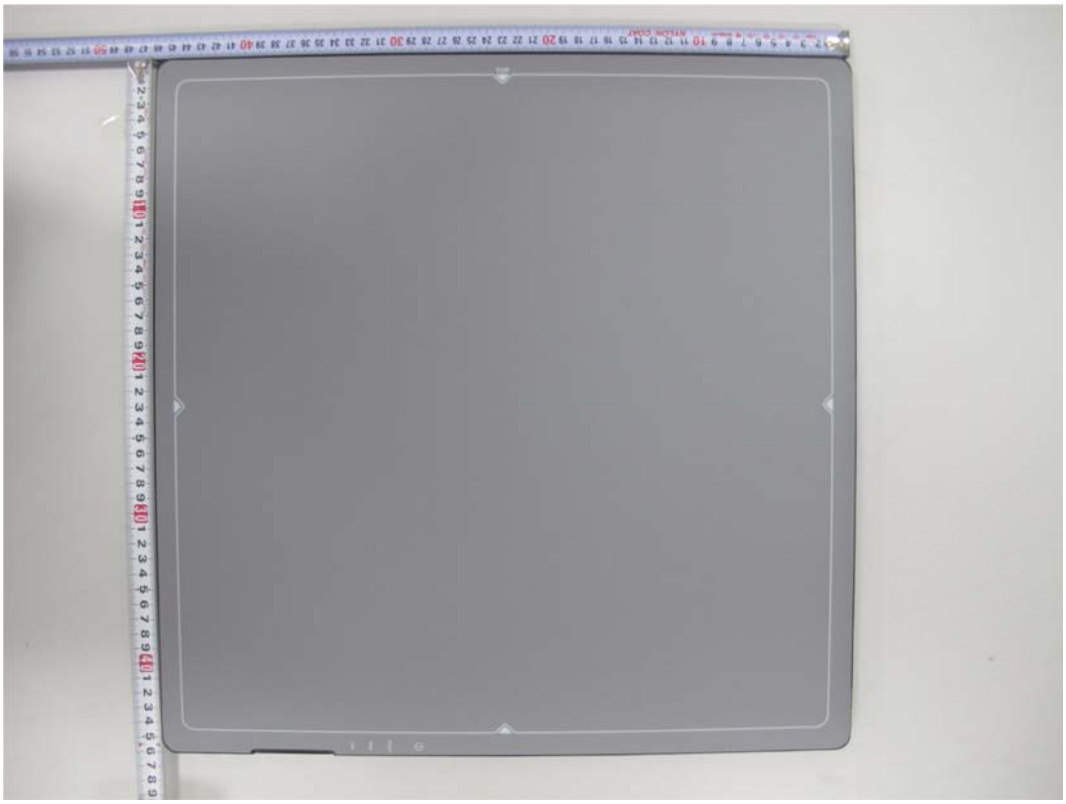
< DUT Photograph >



Front

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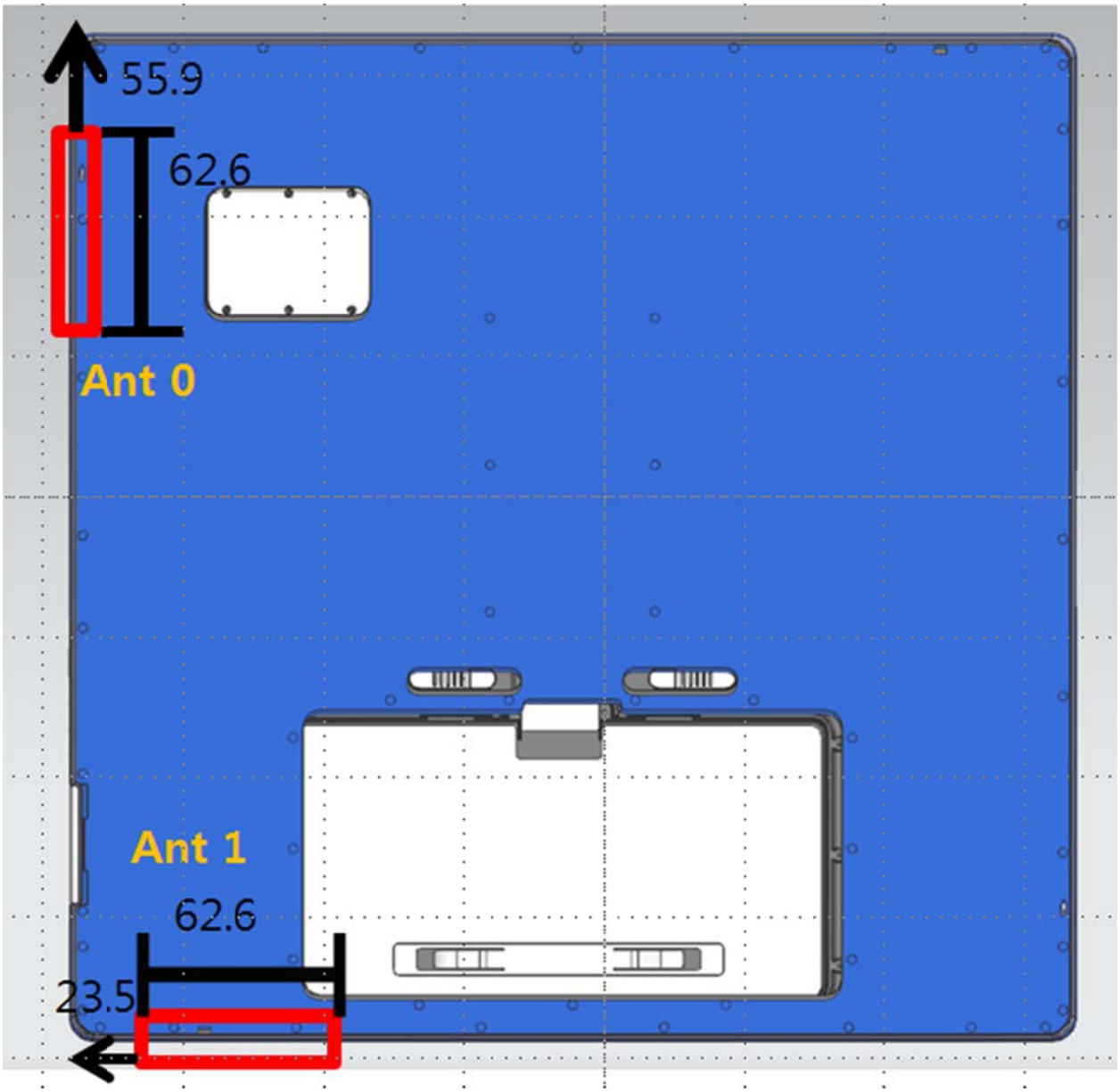
Back

ANNEX D. ANTENNA INFORMATION

< Antenna location >



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< Antenna Data Sheet >

Attn. : SAMSUNG

SPECIFICATION

Product Name : C1 X-ray Detector Antenna

Product P/N : MI42-01001A / MI42-01002A

Approval Model : SDR-G4335W

Accepted for this product

(Approval No. :)

Approval by SAMSUNG	Division	Circuital	Mech.	Approved
	Name			
	Signature			
Approval By IVIEW	Division	Submitted	Checked	Approved
	Name			
	Signature			

IVIEW Co.,Ltd.
Address : A-#808, DaeSung D-POLIS, Knowledge Industry Center, 543-1
Gasan-dong, Geumcheon-gu, Seoul City, Korea

Tel. : +82-70-4101-1056
FAX : +82-303-3130-1056
C.P : +82-10-2629-1056
E-mail : myogeun@i-view.co.kr

Table of Contents

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VIEW

1. OUTLINE

This Approval sheet is regulation for WIFI ANTENNA

2. STANDARD

Refer to the outdrawing of WIFI Antenna including material specification on page 6~7.

3. ELECTRICAL SPEC.

3.1 Frequency Range

Service / Frequency	WIFI	
	2.45GHz	5.4GHz
Frequency(MHz)	2400 ~ 2500	5200 ~ 5800

3.2 Directivity

OMNI-DIRECTIONAL

3.3 V.S.W.R.

Impedance Matching optimization is performed under the below mentioned environment.

3.3.1 Free-space Environment

Service / Mode	WIFI	
	Frequency(MHz)	
	2450	5400
V.S.W.R. (WIFI_SAMSUNG-002)	< 3.0	< 3.0
V.S.W.R. (WIFI_SAMSUNG-003)	< 3.0	< 3.0

(Free Space means the handset is held in a non-conductive device and away from any conductive objects)

3.3.2 V.S.W.R. Measurement Method

- By using Network Analyzer, Needs to calibrate with testing cable.
- Network Analyzer calibration range is from 2000[MHz] to 3000[MHz].
- Set the probe length within 500mm after positioned with target device.
- Measure the target device after put on roughly 20cm polystyrene from bottom surface.

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EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

VIEW

3.4 Gain

3.4.1 WIFI-SAMSUNG-002(MI42-01002A) Antenna

Peak & 3D Avg. Gain (Efficiency) (Unit:dBi)

Mode \ Service	WIFI	
	Frequency(MHz)	
	2400	5400
Peak Gain	-3.0	-3.0
Avg. Gain (Efficiency)	-8.0	-8.0

3.4.2 WIFI-SAMSUNG-003(MI42-01001A) Antenna

Peak & 3D Avg. Gain (Efficiency) (Unit:dBi)

Mode \ Service	WIFI	
	Frequency(MHz)	
	2400	5400
Peak Gain	-7.0	-9.0
Avg. Gain (Efficiency)	-11.0	-15.0

3.4.3 Measurement Method

Measure the radiation pattern from the different frequency (Rxmin, Rxmax) each other of two service band.
On the anechoic chamber, measure the source antenna polarization after put on the target device like as Fig 3.5.1 (a),
Fig 3.5.1(b) is measured the average value for maximum gain and average gain for average value of each different frequency after check the receiving level of target device by each rotate angle with vertical polarization & horizontal polarization.

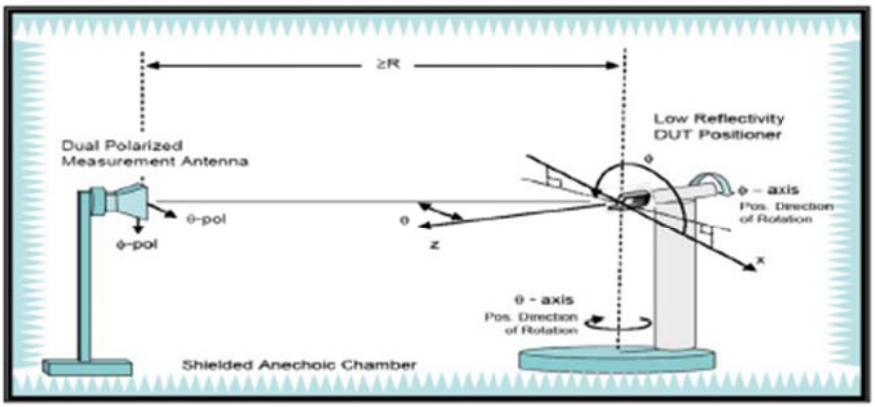

Fig.3.5.1 Gain Measurement system.

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EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

3.6 Handling Power

P = 2W under

Etc. Items

1) Follow by mutual consent when if add the new item besides this approval sheet.
2) Notice : This WIFI Antenna may become damage for organic solvent, acidified aqueous solution, alkali aqueous solution, so please handle it carefully
3) For TBD(To Be Determined) items, it will be fixed after decided packing specification.

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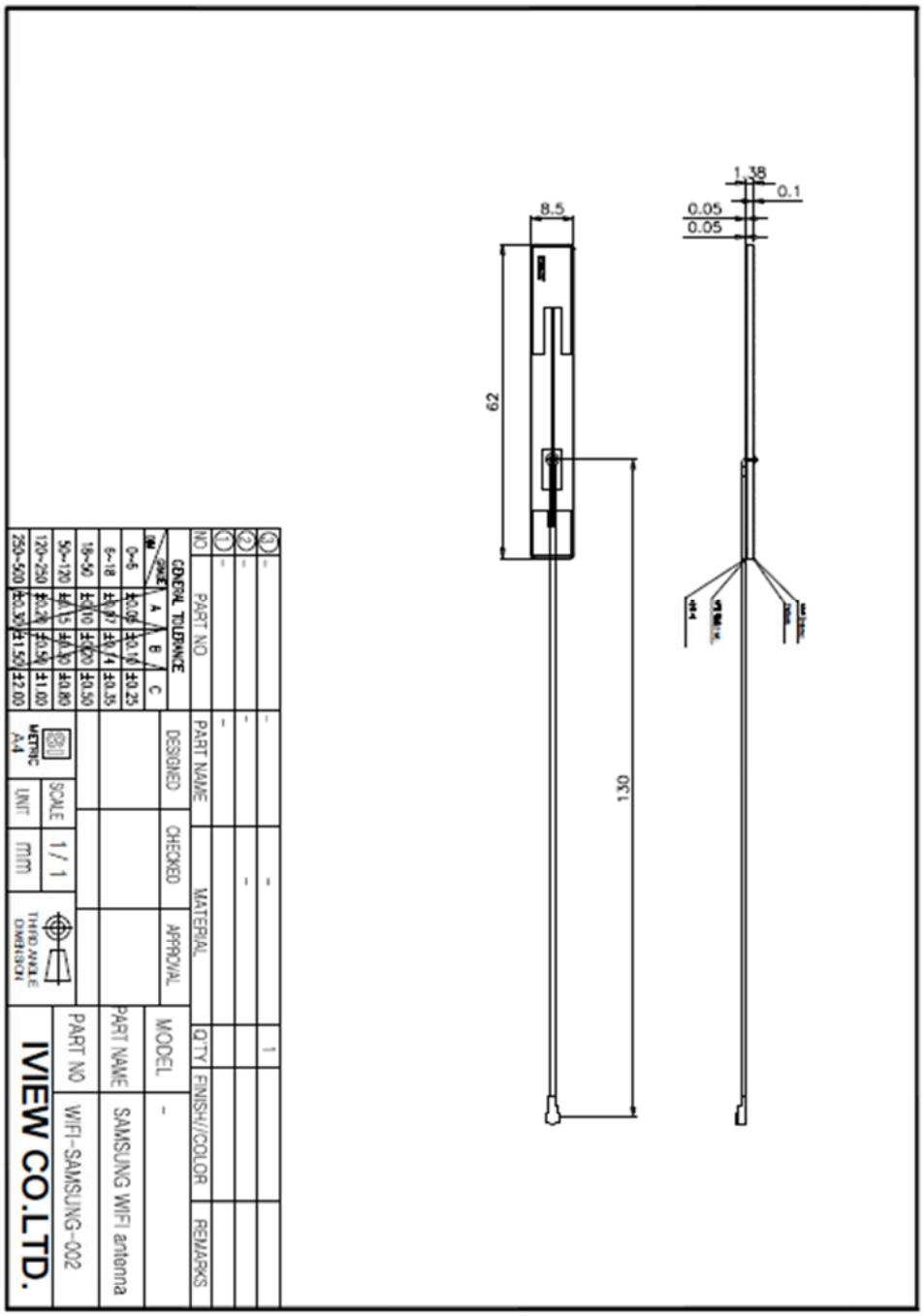
VIEW

4. DRAWING

4-1. Antenna Drawing



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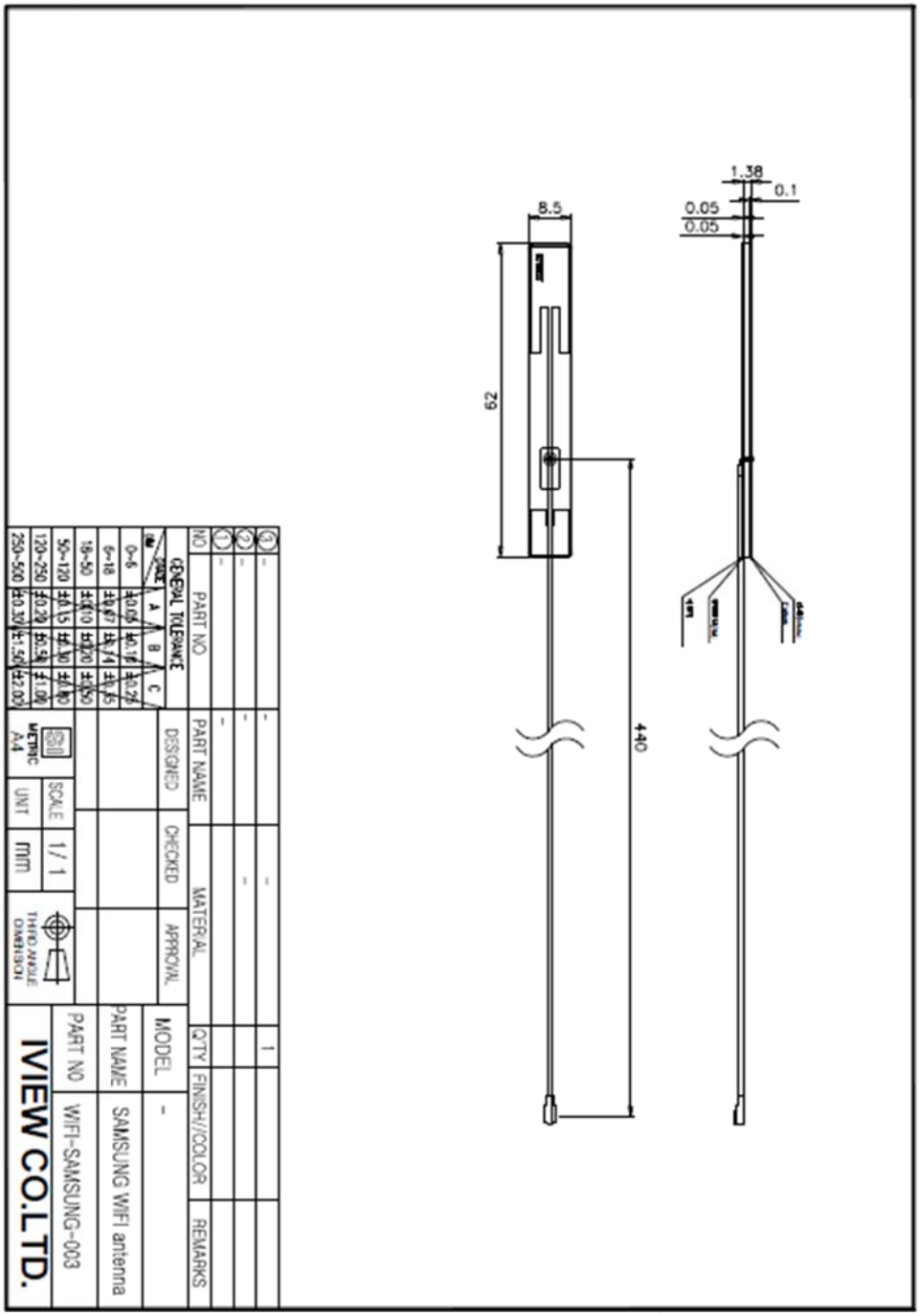
VIEW



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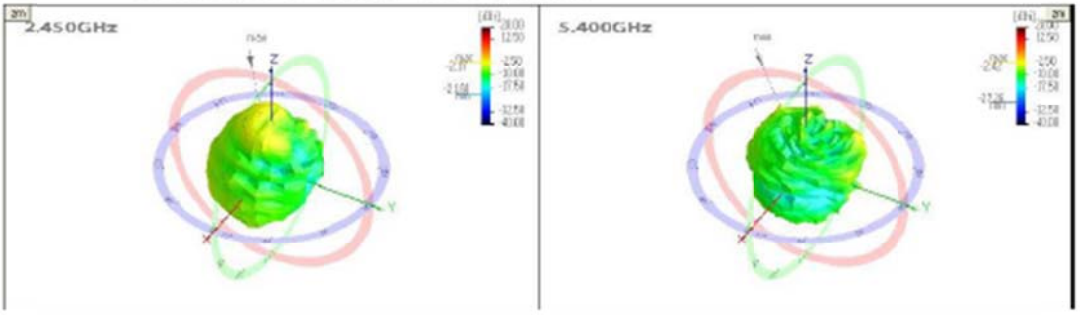
VIEW

5. ELECTRICAL PERFORMANCE

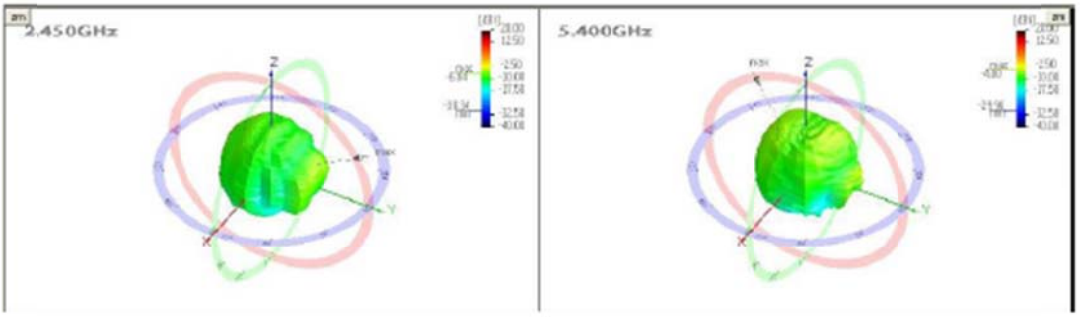
5.1 3D Gain Pattern

5.1.1 WIFI-SAMSUNG-002 Antenna



No.	Freq.	Eff.[%]	Avg.[dBi]	Peak[dBi]	θ[deg]	φ[deg]	Avg.[dBi]	Peak[dBi]	φ[deg]	BW[deg]	Avg.[dBi]	Peak[dBi]	θ[deg]	BW[deg]	Avg.[dBi]	Peak[dBi]	θ[deg]	BW[deg]
1	2.400	2.96	-15.29	-9.97	-110.00	90.00	-14.70	-10.92	265.00	121.27	-15.65	-12.42	25.00	999.00	-15.35	-9.97	-110.00	56.89
2	2.450	20.13	-6.96	-2.17	-20.00	60.00	-6.79	-2.64	265.00	116.05	-7.24	-3.75	25.00	999.00	-6.84	-2.27	-115.00	71.54
3	2.500	3.61	-14.20	-8.66	-26.00	60.00	-14.41	-10.36	265.00	105.01	-14.25	-10.02	20.00	999.00	-13.86	-8.15	-20.00	999.00
4	5.200	6.95	-11.64	-6.31	-146.00	45.00	-15.25	-10.27	270.00	38.17	-11.61	-6.49	-150.00	24.35	-11.17	-7.30	-55.00	999.00
5	5.300	14.49	-8.39	-2.28	-120.00	45.00	-10.67	-5.36	135.00	19.74	-8.82	-3.29	-150.00	14.40	-8.21	-4.25	-95.00	999.00
6	5.400	13.42	-8.72	-2.42	-50.00	60.00	-9.82	-5.41	265.00	28.57	-9.80	-4.29	-110.00	14.72	-9.23	-3.58	-115.00	26.83
7	5.500	8.85	-10.53	-4.04	100.00	150.00	-9.96	-6.65	135.00	49.33	-11.75	-6.61	-15.00	999.00	-10.72	-5.64	-120.00	31.77
8	5.600	2.27	-16.44	-11.04	-125.00	45.00	-15.90	-12.16	265.00	116.19	-16.79	-12.84	-15.00	999.00	-16.39	-11.22	-80.00	999.00
9	5.700	1.05	-19.78	-12.82	-75.00	45.00	-19.87	-14.52	165.00	51.77	-20.43	-10.44	-105.00	51.36	-20.68	-14.66	-120.00	15.05
10	5.800	0.86	-20.66	-12.90	100.00	165.00	-19.83	-15.14	210.00	11.54	-20.79	-14.79	-85.00	38.46	-21.07	-14.96	-15.00	999.00

5.1.2 WIFI-SAMSUNG-003 Antenna



No.	Freq.	Eff.[%]	Avg.[dBi]	Peak[dBi]	θ[deg]	φ[deg]	Avg.[dBi]	Peak[dBi]	φ[deg]	BW[deg]	Avg.[dBi]	Peak[dBi]	θ[deg]	BW[deg]	Avg.[dBi]	Peak[dBi]	θ[deg]	BW[deg]
1	2.400	3.34	-14.76	-10.53	-20.00	75.00	-14.96	-11.76	120.00	79.14	-14.13	-11.21	-25.00	999.00	-14.81	-10.74	-20.00	999.00
2	2.450	7.77	-11.10	-6.84	60.00	90.00	-11.05	-7.55	120.00	76.16	-10.85	-6.20	5.00	999.00	-10.90	-6.84	60.00	999.00
3	2.500	1.54	-18.11	-13.16	75.00	75.00	-17.61	-13.98	120.00	71.60	-18.36	-15.96	10.00	999.00	-17.71	-13.28	65.00	999.00
4	5.200	3.95	-14.04	-8.19	75.00	90.00	-14.30	-8.84	105.00	20.60	-14.04	-9.69	10.00	999.00	-13.14	-8.19	75.00	999.00
5	5.300	5.11	-12.92	-7.77	75.00	90.00	-13.44	-8.22	75.00	20.28	-13.22	-9.14	0.00	999.00	-12.19	-7.77	75.00	999.00
6	5.400	8.80	-10.54	-4.80	-25.00	105.00	-11.25	-8.23	105.00	19.25	-11.27	-8.77	-25.00	999.00	-10.02	-5.04	-25.00	999.00
7	5.500	3.40	-14.69	-8.42	-25.00	90.00	-15.05	-12.90	150.00	31.67	-15.46	-12.79	0.00	999.00	-14.41	-8.42	-25.00	999.00
8	5.600	0.57	-22.43	-15.04	-25.00	45.00	-24.37	-19.49	165.00	10.64	-27.01	-21.37	-140.00	5.92	-23.60	-16.54	-25.00	999.00
9	5.700	0.53	-22.74	-15.10	75.00	90.00	-23.91	-20.57	150.00	34.60	-24.48	-19.71	-25.00	999.00	-22.48	-15.10	75.00	999.00
10	5.800	0.75	-21.26	-13.15	75.00	90.00	-20.56	-14.90	75.00	41.73	-20.61	-16.66	-25.00	999.00	-19.79	-13.15	75.00	999.00

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