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Prüfbericht - Nr.: *Test Report No.:*	**19660166 001**		**Seite 1 von 17** *Page 1 of 17*
Auftraggeber: *Client:*	**Isabella Products, Inc.** **23 Bradford Street, 2nd Floor** **Concord, MA 01742**		
Gegenstand der Prüfung: *Test item:*	**Fable Tablet**		
Bezeichnung: *Identification:*	**FABLE 001 – ORG** **FABLE 001 – BLK** **FABLE 001 – ORD** **FABLE 001 – BLU**	**Serien-Nr.:** *Serial No.*	**150531000003**
Wareneingangs-Nr.: *Receipt No.:*	**1803067493**	**Eingangsdatum:** *Date of receipt:*	**22.04.2015**
Prüfort: *Testing location:*	**Refer Page 4 of 17 for test facilities**		
Prüfgrundlage: *Test specification:*	**FCC 47 CFR Part 2 (2.1093)** **ANSI/IEEE C95.1-1992** **IEEE 1528-2003**		
Prüfergebnis: *Test Result:*	**Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n).** *The test items passed the test specification(s).*		
Prüflaboratorium: *Testing Laboratory:*	**TÜV Rheinland (India) Pvt. Ltd.** 82/A, 3rd Main, West Wing, Electronic City Phase 1 Hosur Road, Bangalore – 560 100. India **FCC Registration No.: 176555**		

geprüft / *tested by:*			**kontrolliert** / *reviewed by:*		
23.04.2015	Girish Kumar.G Test Engineer		24.04.2015	Raghavendra Kulkarni Senior Manager	
Datum *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*	**Datum** *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*

Sonstiges /*Other Aspects:* **FCC ID : 2ADNZ10490056**

Abkürzungen:				***Abbreviations:***			
	P(ass)	=	***entspricht Prüfgrundlage***		***P(ass)***	=	***passed***
	F(ail)	=	***entspricht nicht Prüfgrundlage***		***F(ail)***	=	***failed***
	N/A	=	***nicht anwendbar***		***N/A***	=	***not applicable***
	N/T	=	***nicht getestet***		***N/T***	=	***not tested***

Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.

This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.

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Test Result Summary

Data rate	SAR (W/kg)	Result
11 Mbps	0.27	Pass
6 Mbps	0.13	Pass
MCS0	0.13	Pass

Note: SAR test reduction and exclusion calculations are done according to the procedure given in KDB No. 447498 D01 General RF Exposure Guidance v05r02.

Content

List of Test and Measurement Instruments 4

General Product Information 5

Product Function and Intended Use 5
Ratings and System Details 5

Test Set-up and Operation Mode 6

Principle of Configuration Selection 6
Test Operation and Test Software 6
Special Accessories and Auxiliary Equipment 6

Test Results 7

1. SAR test reduction and exclusion 7
2. Tissue simulating liquid dielectric parameters 8
3. System Validation 9
4. Specific Absorption rate of EUT 11

List of Test and Measurement Instruments

Equipment	Manufacturer	Model	S/N	Calibration Due Date
Power meter	Agilent Technologies	N1913A	MY50000459	27.03.2016
Power Sensor	Agilent Technologies	E4412A	MY50360055	20.05.2015
Signal Analyzer	Rohde & Schwarz	FSV7	101644	30.10.2015
Pre-amplifier	Mini Circuits	ZVA-183-S+	NA	10.11.2015
Attenuator	Huber and Schuner	6810.17.A	770041	02.01.2016
Network analyser	Rhode and Schwarz	ZVL3	100270	10.01.2016
Robot	Staubli	NA	579401-01	NA
E-Filed Probe EX3DV4	SPEAG	EX3DV4	3886	22.10.2015
Dipole	SPEAG	D2450V2	902	16.10.2015

Testing Facilities:

1) TUV Rheinland (India) Private Limited
82/A, 3rd Main, West Wing
Electronic City Phase 1, Hosur Road
Bangalore – 560 100, India.

General Product Information

Product Function and Intended Use

Fable is a 7 inch tablet designed for kid's entertainment and education purpose. Fable is designed to use as handheld computer with the plastic enclosure. This unit can get connected to internet/servers using WIFI connectivity. It provides the necessary education and entertainment contents on 7 inch LCD Screen. It also features touch panel input, 3MP camera, Accelerometer, internal Mic and Speaker with Head phone connectivity. This battery powered unit is intended for the personal use and expected to be used at the close proximity of the human body.

Ratings and System Details

Operating Frequency Range	2400MHz – 2483.50MHz	
No. of channel	11	
Channel Spacing	5MHz	
Transmitted Power	802.11b	09.77 dBm
	802.11g	05.61 dBm
	802.11n	05.52 dBm
Data Rate	802.11b: 1,2, 5.5,11 Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n: 6.5, 14.4, 21.7, 28.9, 39, 57.8, 65Mbps	
Number of antenna	One	
Antenna Gain and Antenna type	0.8dBi, Chip Multilayer Antenna	
Supply Voltage to Product	5V DC	
Environmental	Operational Temperature: 0ºC to 45º C	

Test Conditions:

Supply Voltage: 5V DC from Power Charger

Environmental conditions:

Temperature: +24.4 º C RH: 57%

Test Set-up and Operation Mode

Principle of Configuration Selection

The test was performed under continuous transmission.

Test Operation and Test Software

Test software was used to enable the continuous transmission and changing the channels (low/mid/high) on the EUT for the tests in this report.

Special Accessories and Auxiliary Equipment

- None

Test Results

1. SAR test reduction and exclusion

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

[(max. power of channel, including tune-up tolerance, mW)/ (min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR,

Where
- f (GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison
- 3.0 and 7.5 are referred to as the numeric thresholds in the step 2 below

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm according to 5) in section 4.1 of 447498 D01 General RF Exposure Guidance v05r02 is applied to determine SAR test exclusion.

Note: Minimum test separation distance from antenna to outer enclosure is found to be 2.5mm.

Calculations:

- f (GHz) = 2.412GHz
- Power = 9.484mW
- Minimum test separation distance = < 5mm

[(9.484mW) / (5mm)] · [√ (2.412)] = 2.9

Limit: should be ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR

Note: The result is rounded to one decimal place for comparison. The Operating frequency at which the maximum RF output power was observed is used for above calculation.

2. Tissue simulating liquid dielectric parameters

For the purpose of the tests as described in this report the following tissue dielectric parameters have been determined by use of a Vector Network Analyzer (VNA). The tables indicate the dielectric parameters of the liquids used during the tests. The indicated required values are derived from IEC 62209-2:2010.

Dielectric parameters for 2450 MHz Tissue

2450 MHz Body simulant liquid was used for the tests for 2450 MHz band frequencies.
The following liquid validation results were obtained, where the maximum deviation should not be more than 10 % of the Relative values (standard).

Results for 2400 MHz Band

Frequency (MHz)	Measured Liquid Temperature (°C)	Measured relative Permittivity	Measured Conductivity (S/m)	Relative Permittivity Standard	Conductivity Standard (S/m)	Relative Permittivity Deviation (%)	Conductivity Deviation (%)
2450	22.56	38.17	1.84	39.2	1.8	-3%	2%

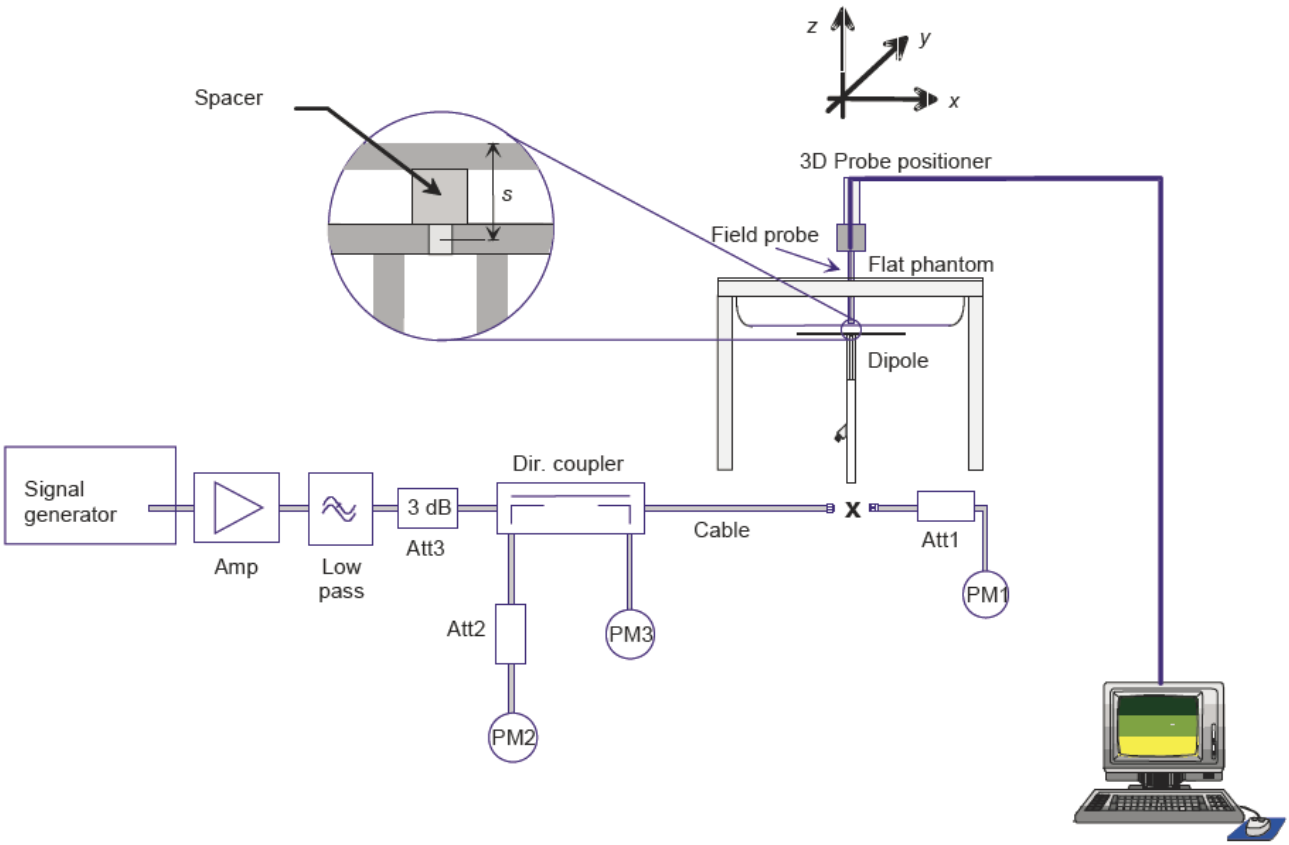
3. System Validation

The purpose of the system performance check (system check) is to verify that the system operates within its specifications at the device test frequency. The system check is to make sure that the system works correctly at the time of the compliance test. The system check has been performed using the specified tissue-equivalent liquid and at a chosen fixed frequency that is within ± 10% of the compliance test mid-band frequency. The system check is performed prior to compliance tests and the result must always be within ±10% of the target value corresponding to the test frequency, liquid and the source used.

The system check detects possible short-term drift and uncertainties in the system, such as:
a) Changes in the liquid parameters (e.g., due to water evaporation or temperature change),
b) Test system component failures,
c) Test system component drift,
d) Operator errors in the set-up or software parameters,
e) Other possible adverse conditions in the system configuration, e.g., RF interference.

The system validation was done with an CW signal no additional validation were done with other signal types.
The results show that this system check is within 10% of the expected values.

System check Setup



Results

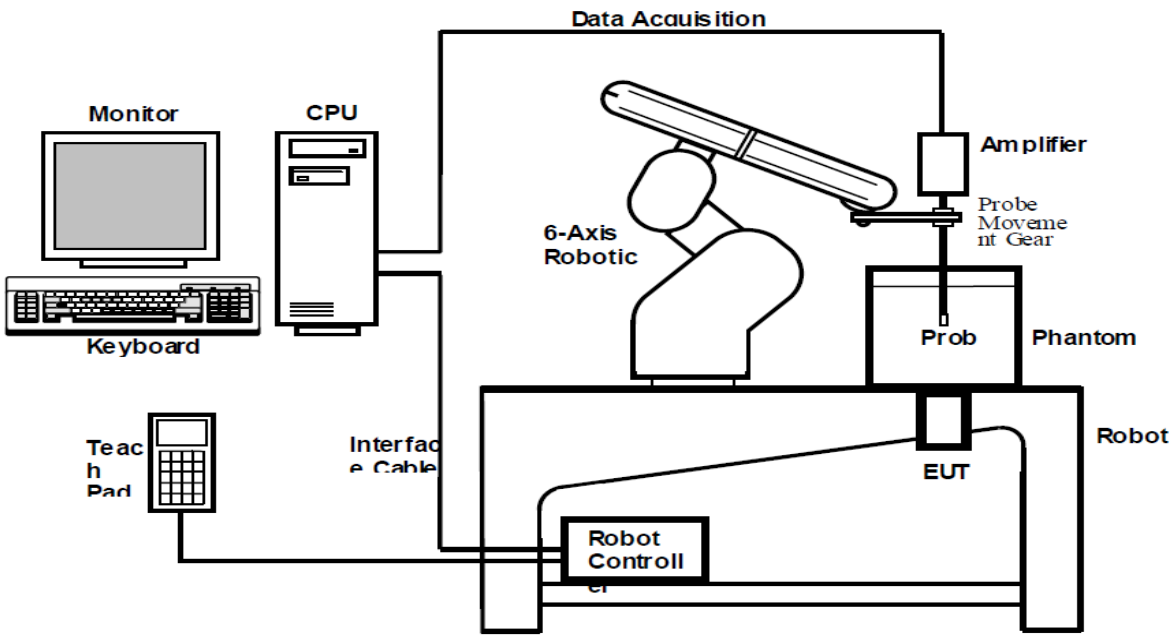
At 2450 MHz a system check was executed according IEEE 1528-2003 and KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r03 Edition 07/02/2014. The setup used is shown in figure 3. The following system performance check results were obtained (referenced to 1W):

Frequency	Target Value (W/kg)	Measured Value (W/kg)	Deviation from Target value (%)	Permissible deviation from target value (%)
2450	52.4	54.8	5	±10

4. Specific Absorption rate of EUT

System Description

The SAR measurement system used by TUVR India is the SPEAG DASY4, which consists of a Staubli robot-arm and controller, SPEAG probe and amplifier and an appropriate phantom as required and considered appropriate for the applied test. The robot is used to move and manipulate the probe to programmed positions inside the phantom to obtain the SAR readings from the EUT.



The system is remote controlled by a PC, which contains the software to control the robot and data acquisition equipment. The software also displays the data obtained from test scans by calculating the measured values into corresponding SAR values based on the currently acceptable calculation methods.

The position and digitized shape of the phantom are made available to the software for accurate positioning of the probe and reduction of set-up time.

In operation, the system first does an area (2D) scan at a fixed depth within the liquid from the inside wall of the phantom. When the maximum SAR point has been found, the system will then carry out a 3D scan centered at that point to determine volume averaged SAR level.

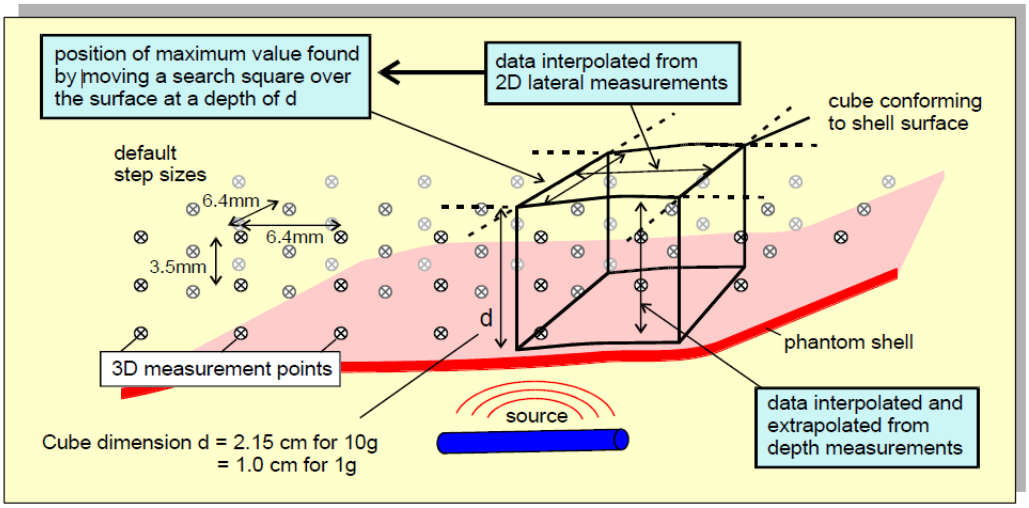
Measurement Procedure

During the SAR measurement, the positioning of the probe is performed with sufficient accuracy to obtain repeatable measurements in the presence of rapid spatial attenuation phenomena. The accurate positioning of the E-field probe is accomplished by using the high precision robot. The robot can be taught to position the probe sensor following a specific pattern of points.

After an area scan has been done a 3D scan is set up around the location of the maximum spot SAR. First, a point within the scan area is visited by the probe and a SAR reading taken at the start of testing. At the end of testing, the probe is returned to the same point and a second reading is taken. Comparison between these start and end readings enables the power (SAR) drift during measurement to be assessed.

Step size and scan information

For the EUT"s 2.4 GHz band a 30 x 30 mm area is scanned centered around the hotspot using 6 steps in the x-y plane and 10 steps of 3.0 mm in the z plane. The first area scan is performed with the probe tip 5 mm above the phantom bottom shell. For the EUT"s 5 GHz band a 24 x 24 mm area is scanned centered around the hotspot using 6 steps in the x-y plane and 6 steps of 3 mm in the z plane. The first area scan is performed with the probe tip 2 mm above the phantom bottom shell.



SARA2 Interpolation and Extrapolation schemes

SARA2 software contains support for both 2D cubic B-spline interpolation as well as 3D cubic B-spline interpolation. In addition, for extrapolation purposes, a general n_{th} order polynomial fitting routine is implemented following a singular value decomposition algorithm. A 4_{th} order polynomial fit is used by default for data extrapolation.

Interpolations of 2D area scan

The 2D cubic B-spline interpolation is used after the initial area scan at fixed distance from the phantom shell wall. The initial scan data are collected with approximately 10 mm spatial resolution and spline interpolation is used to find the location of the local maximum to within a 1mm resolution for positioning the subsequent 3D scanning.

Extrapolation of 3D scan

For the 3D scan, data are collected on a spatially regular 3D grid having (by default) 6.4 mm steps in the lateral dimensions and 3.5 mm steps in the depth direction (away from the source). DASY4 enables full control over the selection of alternative step sizes in all directions. The digitized shape of the Flat Phantom is available to the DASY4 software, which decides which points in the 3D array are sufficiently well within the shell wall to be visited by the SAR probe. After the data collection, the data are extrapolated in the depth direction to assign values to points in the 3D array closer to the shell wall. A notional extrapolation value is also assigned to the first point outside the shell wall so that subsequent interpolation schemes will be applicable right up to the shell wall boundary.

Interpolation of 3D scan and volume averaging

The procedure used for defining the shape of the volumes used for SAR averaging in th e SARA2 software follow the method of adapting the surface of the „cube" to conform with the surface of the phantom. This is called, here, the conformal scheme.

For each row of data in the depth direction, the data are extrapolated and interpolated to les s than 1 mm spacing and average values are calculated from the phantom surface for the row of data over distances corresponding to the requisite depth for 10g and 1g cubes. This results in two 2D arrays of data, which are then cubic B-spline interpolated to sub mm lateral resolution. A search routine then moves an averaging square around through the 2D array and records the maximum value of the corresponding 1g and 10g volume averages. For measurements in rectangular, box phantoms, the distance between the phantom wall and the closest set of gridded data points is entered into the software.

The default step size (dstep) used is 3.5 mm, but this is under user-control. The compromise is with time of scan, so it is not practical to make it much smaller or scan times become long and power -drop influences become larger. The robot positioning system specification for the repeatability of the positioning (dss) is 0.04 mm.

The flat phantom is made from Polymethylmethacrylate (PMMA), a low-loss dielectric material with dielectric constant and loss tangent less than 5.0 and 0.05 respectively. The shell thickness for all regions coupled to the test device and its antenna are within 2.0 ± 0.2 mm.

For the upright phantom, the alignment is based upon registration of the rotation axis of the phantom on its 253 mm-diameter base plate bearing and the position of the probe axis when commanded to go to the axial position. A laser alignment tool is provided. This enables the registration of the phantom tip (dmis) to be assured to within approx. 0.2 mm. This alignment is done with reference to the actual probe tip after installation and probe alignment.

Results:

Body Worn Accessory SAR:

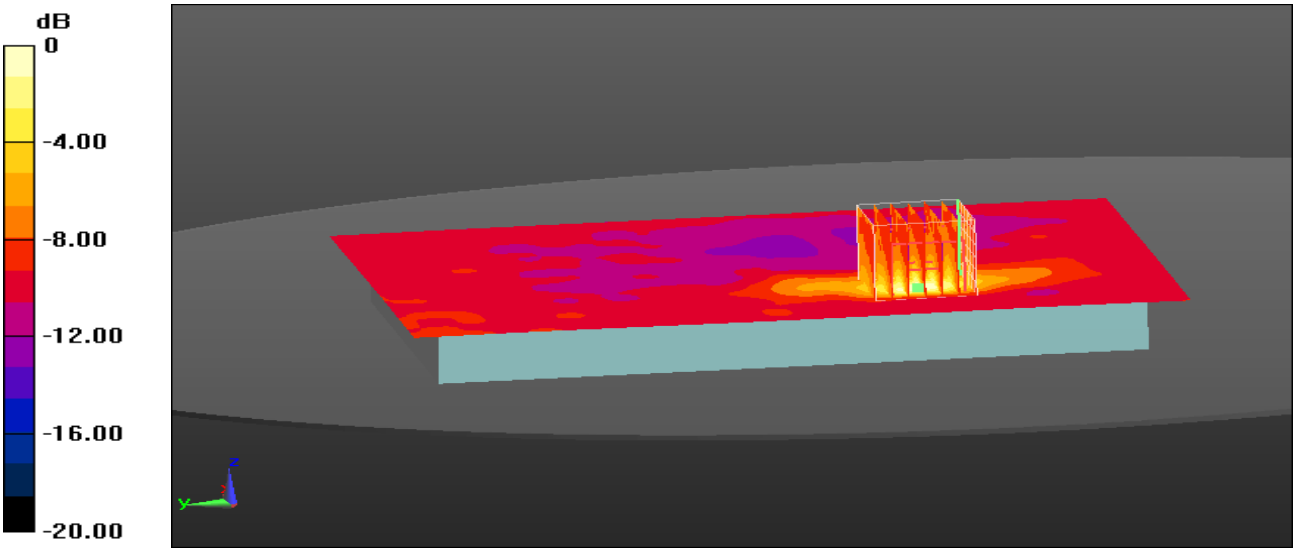
Worst case results are listed below:

<Wi-Fi SAR>

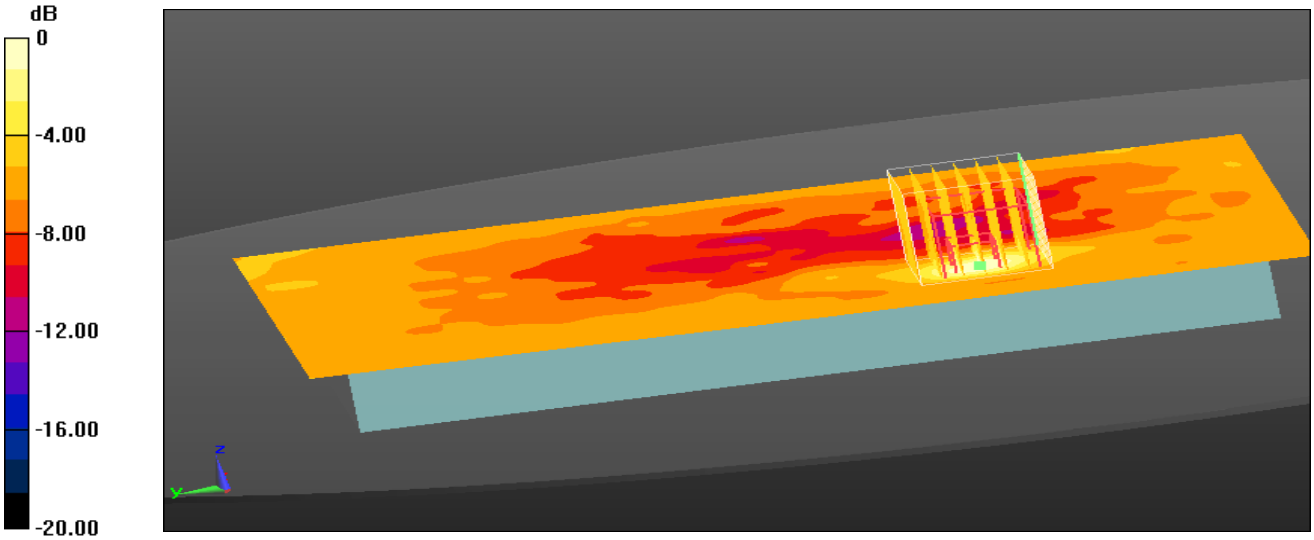
Data Rate (Mbps)	Channel Frequency (MHz)	SAR (W/kg)	Limit (W/kg)	Result
11	2412	0.27	1.6	Pass
	2462	0.14	1.6	Pass
6	2412	0.13	1.6	Pass
	2462	0.08	1.6	Pass
6.5	2412	0.13	1.6	Pass
	2462	0.08	1.6	Pass

11Mbps

Channel Low

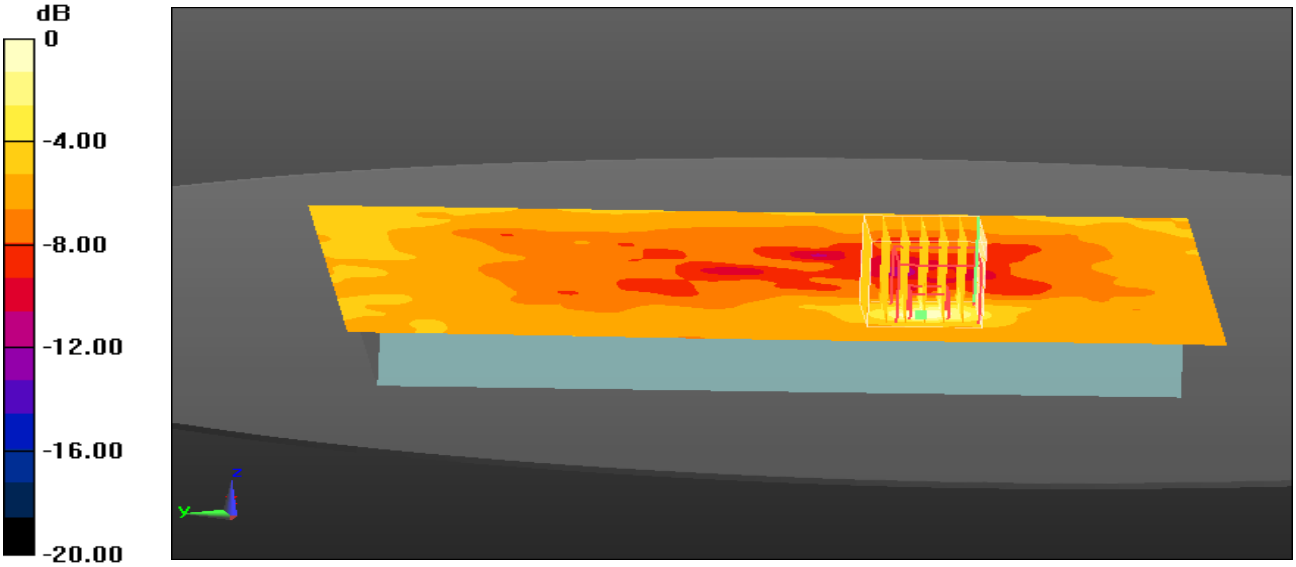


Channel High

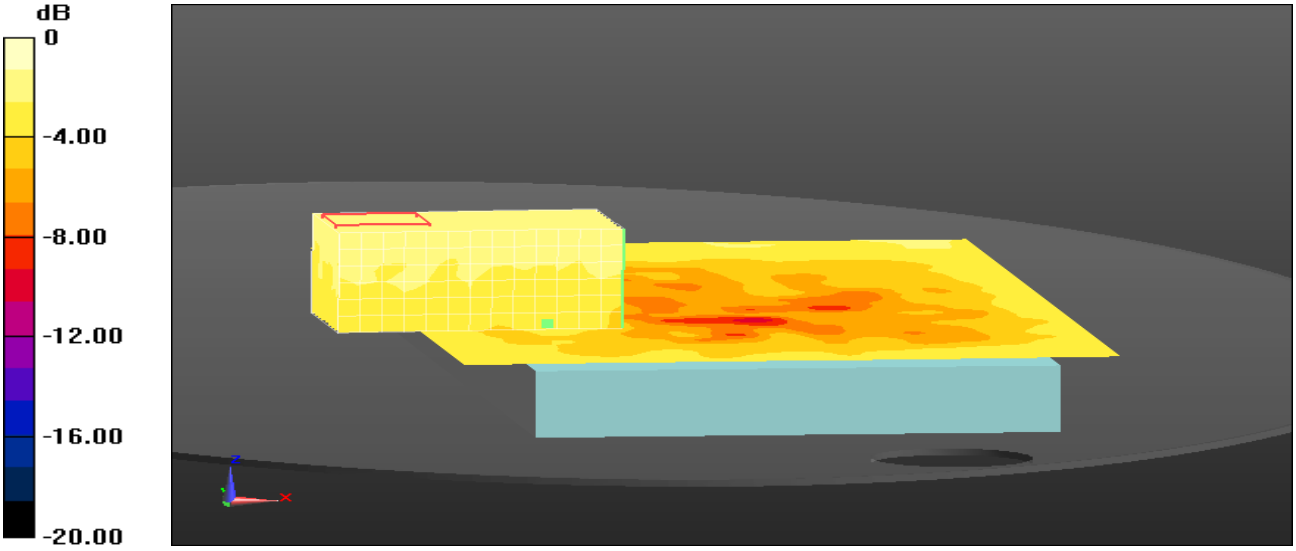


6Mbps

Channel Low

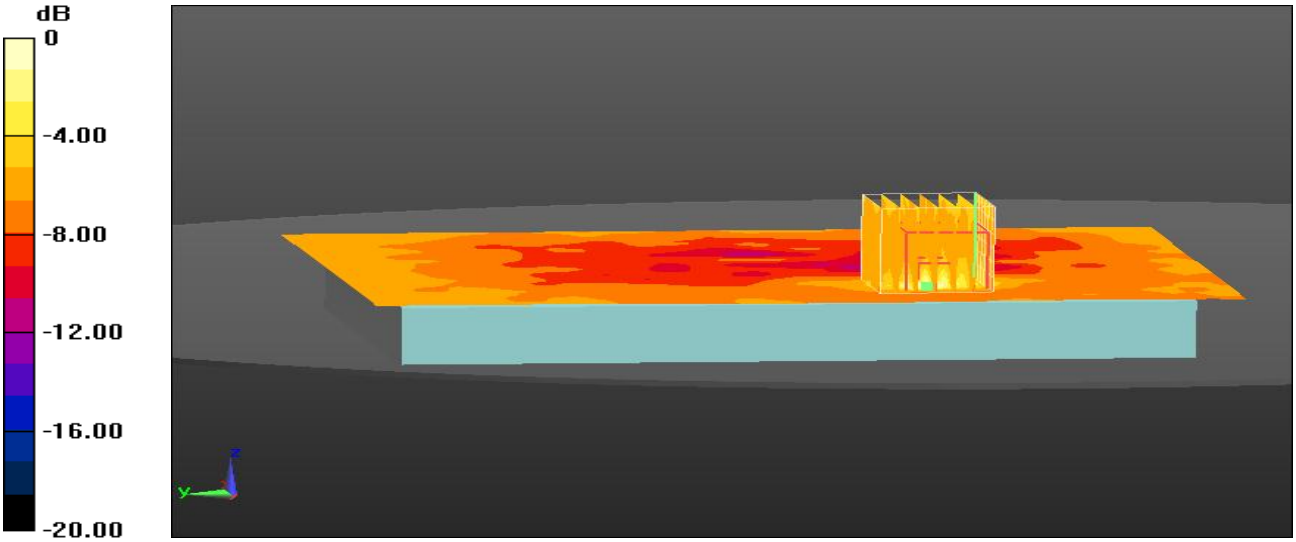


Channel High

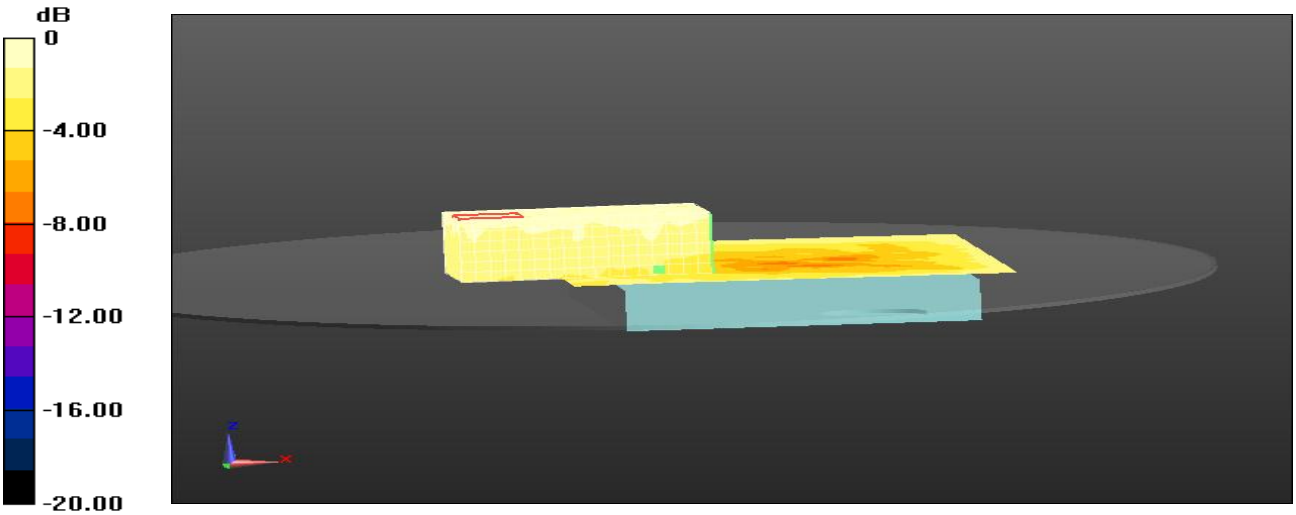


6.5 Mbps

Channel Low



Channel High



Test Setup Photo