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CERTIFICATE OF COMPLIANCE
SAR EVALUATION

Novatel Wireless 9605 Scranton Road, Suite 300 San Diego, CA 92121	Dates of Test: Dec. 1-5, 2016, Aug. 29, 2017 & May 1, 2018 Test Report Number: SAR.20161204 Revision D

FCC ID:	PKRNVWMIFI7000
IC Certificate:	3229A-MIFI7000
Model(s):	MIFI7000
Test Sample:	Engineering Unit Same as Production
FID Number:	SZ17061900013 & SV150917A00717
Equipment Type:	Wireless Hotspot Modem
Classification:	Portable Transmitter Next to Body
TX Frequency Range:	699 – 716 MHz, 777 – 787 MHz, 824 – 848 MHz; 1850 – 1910 MHz; 1710 – 1780 MHz, 2500 – 2570 MHz, 2412 – 2462 MHz, 5150 – 5250 MHz, 5745 – 5825 MHz
Frequency Tolerance:	± 2.5 ppm
Maximum RF Output:	750 MHz (LTE) – 23.5 dBm, 850 MHz (GSM) – 34.0 dBm, 850 MHz (WCDMA) – 23.5 dBm, 850 MHz (CDMA) – 24.5 dBm, 850 MHz (LTE) – 24.0 dBm, 1900 MHz (GSM) – 31.0 dBm, 1900 MHz (WCDMA) – 23.5 dBm, 1900 MHz (CDMA) – 23.5 dBm, 1900 MHz (LTE) – 23.5 dBm, 1750 MHz (WCDMA) – 23.5 dBm , 1750 MHz (LTE) – 23.5 dBm, 2550 MHz (LTE) – 23.5 dBm, 2450 MHz – 18.0 dBm, 5200 MHz – 12.0 dBm, 5800 MHz – 20.0 dBm Conducted
Signal Modulation:	WCDMA, GMSK, 8-PSK, CDMA, QPSK, 16QAM, DSSS, OFDM
Antenna Type:	WWAN – Novatel Wireless, P/N 01021102 (Main Except Band 7), P/N 01021101 (Diversity Except Band 7), P/N 12023212.01 (Main Band 7), P/N 12023222 (Diversity Band 7), WLAN – Novatel Wireless, P/N 12023210.01 (Chain 0 & 1)
Application Type:	Certification
FCC Rule Parts:	Part 2, 15C, 15E, 22, 24, 27
KDB Test Methodology:	KDB 447498 D01 v06, KDB 248227 v02r02, KDB 941225 D01 v03r01, D02 v02r01, D05 v02r01 & D06 v01
Industry Canada:	RSS-102 Issue 5, Safety Code 6
Max. Stand Alone SAR Value:	1.42 W/kg Reported
Max. Simultaneous SAR Value:	0.04 Separation Ratio
Separation Distance:	10 mm

This wireless mobile and/or portable device has been shown to be compliant for localized specific absorption rate (SAR) for uncontrolled environment/general exposure limits specified in ANSI/IEEE Std. C95.1-1992 and had been tested in accordance with the measurement procedures specified in IEEE 1528-2013 and IEC 62209-2:2010 (See test report).

I attest to the accuracy of the data. All measurements were performed by myself or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

RF Exposure Lab, LLC certifies that no party to this application is subject to a denial of Federal benefits that includes FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 853(a).

Jay M. Moulton
Vice President

ACCREDITED
Testing Cert. # 2387.01

Table of Contents

1. Introduction

This measurement report shows compliance of the Novatel Wireless Model MIFI7000 FCC ID: PKRNVWMIFI7000 with FCC Part 2, 1093, ET Docket 93-62 Rules for mobile and portable devices and IC Certificate: 3229A-MIFI7000 with RSS102 Issue 5 & Safety Code 6. The FCC has adopted the guidelines for evaluating the environmental effects of radio frequency radiation in ET Docket 93-62 on August 6, 1996 to protect the public and workers from the potential hazards of RF emissions due to FCC regulated portable devices. [1], [6]

The test results recorded herein are based on a single type test of Novatel Wireless Model MIFI7000 and therefore apply only to the tested sample.

The test procedures, as described in ANSI C95.1 – 1999 Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz [2], ANSI C95.3 – 2002 Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields [3], IEEE Std.1528 – 2013 Recommended Practice [4], and Industry Canada Safety Code 6 Limits of Human Exposure to Radiofrequency Electromagnetic Fields in the Frequency Range from 3kHz to 300 GHz were employed.

The following table indicates all the wireless technologies operating in the MIFI7000 wireless modem. The table also shows the tolerance for the power level for each mode.

Band	Technology	Class	3GPP Nominal Power dBm	Calibrated Nominal Power dBm	Tolerance dBm	Lower Tolerance dBm	Upper Tolerance dBm
Band 2 – 1900 MHz	LTE	3	23.0	23.0	+0.5/-1.7	21.3	23.5
Band 4 – 1750 MHz	LTE	3	23.0	23.0	+0.5/-1.7	21.3	23.5
Band 5 – 835 MHz	LTE	3	23.0	23.0	+1.0/-1.7	21.3	24.0
Band 12 – 750 MHz	LTE	3	23.0	23.0	+0.5/-1.7	21.3	23.5
Band 13 – 750 MHz	LTE	3	23.0	23.0	+0.5/-1.7	21.3	23.5
Band 17 – 750 MHz	LTE	3	23.0	23.0	+0.5/-1.7	21.3	23.5
Band 66 – 1750 MHz	LTE	3	23.0	23.0	+0.5/-1.7	21.3	23.5
Band 7 – 2550 MHz	LTE	3	23.0	23.0	+0.5/-1.7	21.3	23.5
Band 2 – 1900 MHz	CDMA/EvDo	2	24.0	23.0	±0.5	22.5	23.5
Band 5 – 850 MHz	CDMA/EvDo	3	24.0	23.75	±0.75	23.0	24.5
Band 2 – 1900 MHz	WCDMA/HSPA	3	23.0	23.0	+0.5/-2.0	21.0	23.5
Band 4 – 1750 MHz	WCDMA/HSPA	3	23.0	23.0	+0.5/-2.0	21.0	23.5
Band 5 – 850 MHz	WCDMA/HSPA	3	23.0	23.0	+0.5/-2.0	21.0	23.5
Band 5 – 850 MHz	GPRS	4	33.0	32.0	+2.0/-1.0	31.0	34.0
Band 5 – 850 MHz	EDGE	E2	27.0	26.5	±1.5	25.0	28.0
Band 2 – 1900 MHz	GPRS	1	30.0	29.5	±1.5	28.0	31.0
Band 2 – 1900 MHz	EDGE	E2	26.0	25.5	±1.5	24.0	27.0
WLAN – 2.4 GHz	802.11b	N/A	N/A	14	±4.0	10	18
WLAN – 2.4 GHz	802.11g/n	N/A	N/A	11	±4.0	7	15
WLAN – 5.2 GHz	802.11an/ac	N/A	N/A	8	±4.0	4	12
WLAN – 5.8 GHz	802.11an/ac	N/A	N/A	16	±4.0	12	20

SAR Definition [5]

Specific Absorption Rate is defined as the time derivative (rate) of the incremental energy (*dW*) 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)

2. SAR Measurement Setup

Robotic System

These measurements are performed using the DASY52 automated dosimetric assessment system. The DASY52 is made by Schmid & Partner Engineering AG (SPEAG) in Zurich, Switzerland and consists of high precision robotics system (Staubli), robot controller, Intel Core2 computer, near-field probe, probe alignment sensor, and the generic twin phantom containing the brain equivalent material. The robot is a six-axis industrial robot performing precise movements to position the probe to the location (points) of maximum electromagnetic field (EMF) (see Fig. 2.1).

System Hardware

A cell controller system contains the power supply, robot controller teach pendant (Joystick), and a remote control used to drive the robot motors. The PC consists of the HP Intel Core2 computer with Windows XP system and SAR Measurement Software DASY52, A/D interface card, monitor, mouse, and keyboard. The Staubli Robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit that performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the PC plug-in card.

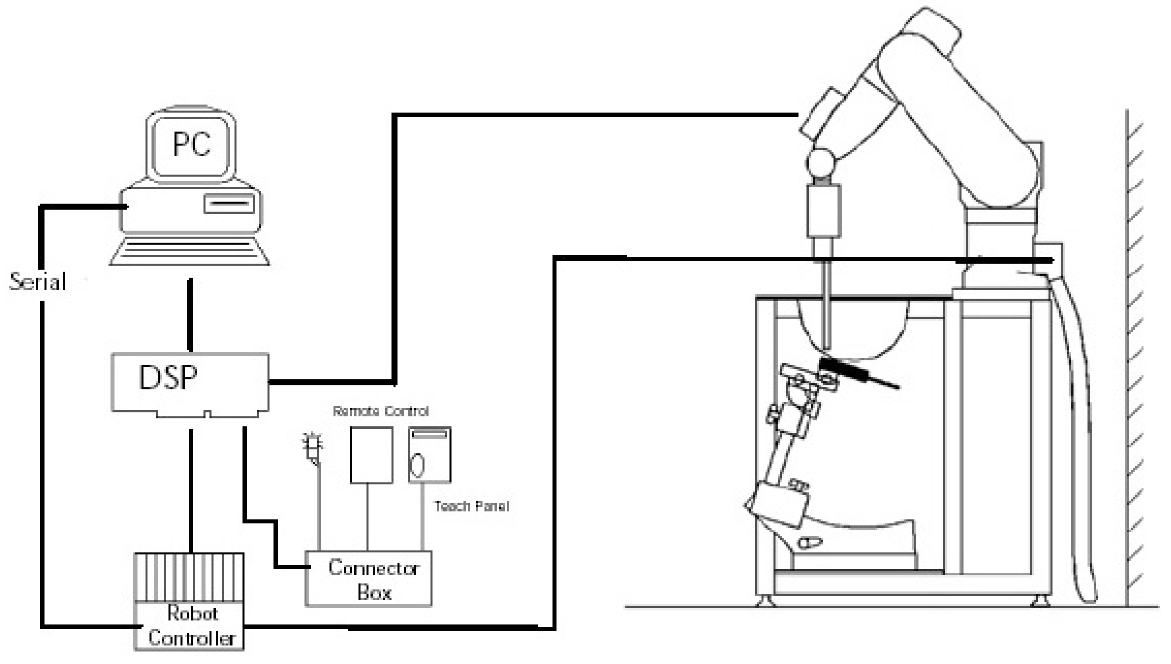


Figure 2.1 SAR Measurement System Setup

System Electronics

The DAE4 consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the PC-card is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer. The system is described in detail in.

Probe Measurement System

The SAR measurements were conducted with the dosimetric probe EX3DV4, designed in the classical triangular configuration (see Fig. 2.2) and optimized for dosimetric evaluation. The probe is constructed using the thick film technique; with printed resistive lines on ceramic substrates. The probe is equipped with an optical multi fiber line ending at the front of the probe tip. (see Fig. 2.3) It is connected to the EOC box on the robot arm and provides an automatic detection of the phantom surface. Half of the fibers are connected to a pulsed infrared transmitter, the other half to a synchronized receiver. As the probe approaches the surface, the reflection from the surface produces a coupling from the transmitting to the receiving fibers. This reflection increases first during the approach, reaches maximum and then decreases. If the probe is flatly touching the surface, the coupling is zero. The distance of the coupling maximum to the surface is independent of the surface reflectivity and largely independent of the surface to probe angle. The DASY52 software reads the reflection during a software approach and looks for the maximum using a 2nd order fitting. The approach is stopped at reaching the maximum.

DAE System

Probe Specifications

Calibration: In air from 10 MHz to 6.0 GHz
In brain and muscle simulating tissue at Frequencies of 450 MHz, 835 MHz, 1750 MHz, 1900 MHz, 2450 MHz, 2600 MHz, 3500 MHz, 5200 MHz, 5300 MHz, 5600 MHz, 5800 MHz

Frequency: 10 MHz to 6 GHz

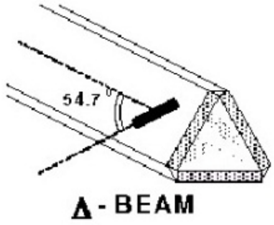


Figure 2.2 Triangular Probe Configurations

Linearity: ±0.2dB (30 MHz to 6 GHz)

Dynamic: 10 mW/kg to 100 W/kg

Range: Linearity: ±0.2dB

Dimensions: Overall length: 330 mm

Figure 2.3 Probe Thick-Film Technique

Tip length: 20 mm

Body diameter: 12 mm

Tip diameter: 2.5 mm

Distance from probe tip to sensor center: 1 mm

Application: SAR Dosimetry Testing
Compliance tests of wireless device

Probe Calibration Process

Dosimetric Assessment Procedure

Each probe is calibrated according to a dosimetric assessment procedure described in with accuracy better than +/- 10%. The spherical isotropy was evaluated with the procedure described in and found to be better than +/-0.25dB. The sensitivity parameters (Norm X, Norm Y, Norm Z), the diode compression parameter (DCP) and the conversion factor (Conv F) of the probe is tested.

Free Space Assessment

The free space E-field from amplified probe outputs is determined in a test chamber. This is performed in a TEM cell for frequencies below 1 GHz, and in a waveguide above 1GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity at the proper orientation with the field. The probe is then rotated 360 degrees until the three channels show the maximum reading. The power density readings equates to 1 mW/cm^2.

Temperature Assessment *

E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulated brain tissue. The measured free space E-field in the medium, correlates to temperature rise in a dielectric medium. For temperature correlation calibration a RF transparent thermistor based temperature probe is used in conjunction with the E-field probe

$$SAR = C\frac{\Delta T}{\Delta t}$$

where:

Δt = exposure time (30 seconds),

C = heat capacity of tissue (brain or muscle),

ΔT = temperature increase due to RF exposure.

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

where:

σ = simulated tissue conductivity,

ρ = Tissue density (1.25 g/cm^3 for brain tissue)

SAR is proportional to ΔT / Δt , the initial rate of tissue heating, before thermal diffusion takes place.
Now it's possible to quantify the electric field in the simulated tissue by equating the thermally derived SAR to the E- field;

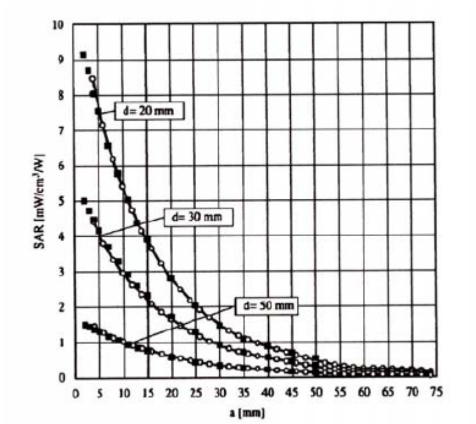


Figure 2.4 E-Field and Temperature Measurements at 900MHz

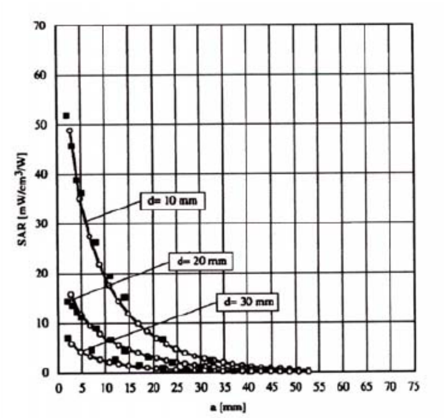


Figure 2.5 E-Field and Temperature Measurements at 1800MHz

Data Extrapolation

The DASY52 software automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics. If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power. The formula for each channel can be given like below;

$$V_i = U_i + U_i^2 \cdot \frac{cf}{dcp_i}$$

with V_i = compensated signal of channel i (i=x,y,z)
U_i = input signal of channel i (i=x,y,z)
cf = crest factor of exciting field (DASY parameter)
dcp_i = diode compression point (DASY parameter)

From the compensated input signals the primary field data for each channel can be evaluated:

E-field probes:

$$E_i = \sqrt{\frac{V_i}{Norm_i \cdot ConvF}}$$

with V_i = compensated signal of channel i (i = x,y,z)
$Norm_i$ = sensor sensitivity of channel i (i = x,y,z) $\mu V/(V/m)^2$ for E-field probes
ConvF = sensitivity of enhancement in solution
E_i = electric field strength of channel i in V/m

The RSS value of the field components gives the total field strength (Hermetian magnitude):

$$E_{tot} = \sqrt{E_x^2 + E_y^2 + E_z^2}$$

The primary field data are used to calculate the derived field units.

$$SAR = E_{tot}^2 \cdot \frac{\sigma}{\rho \cdot 1000}$$

with SAR = local specific absorption rate in W/g
E_{tot} = total field strength in V/m
σ = conductivity in [mho/m] or [Siemens/m]
ρ = equivalent tissue density in g/cm³

The power flow density is calculated assuming the excitation field to be a free space field.

$$P_{pwe} = \frac{E_{tot}^2}{3770}$$

with P_{pwe} = equivalent power density of a plane wave in W/cm²
E_{tot} = total electric field strength in V/m

Scanning procedure

- The DASY installation includes predefined files with recommended procedures for measurements and system check. They are read-only document files and destined as fully defined but unmeasured masks. All test positions (head or body-worn) are tested with the same configuration of test steps differing only in the grid definition for the different test positions.

- The „reference“ and „drift“ measurements are located at the beginning and end of the batch process. They measure the field drift at one single point in the liquid over the complete procedure. The indicated drift is mainly the variation of the DUT's output power and should vary max. +/- 5 %.

- The highest integrated SAR value is the main concern in compliance test applications. These values can mostly be found at the inner surface of the phantom and cannot be measured directly due to the sensor offset in the probe. To extrapolate the surface values, the measurement distances to the surface must be known accurately. A distance error of 0.5mm could produce SAR errors of 6% at 1800 MHz. Using predefined locations for measurements is not accurate enough. Any shift of the phantom (e.g., slight deformations after filling it with liquid) would produce high uncertainties. For an automatic and accurate detection of the phantom surface, the DASY5 system uses the mechanical surface detection. The detection is always at touch, but the probe will move backward from the surface the indicated distance before starting the measurement.

- The „area scan“ measures the SAR above the DUT or verification dipole on a parallel plane to the surface. It is used to locate the approximate location of the peak SAR with 2D spline interpolation. The robot performs a stepped movement along one grid axis while the local electrical field strength is measured by the probe. The probe is touching the surface of the SAM during acquisition of measurement values. The scan uses different grid spacings for different frequency measurements. Standard grid spacing for head measurements in frequency ranges ≤ 2GHz is 15 mm in x - and y-dimension. For higher frequencies a finer resolution is needed, thus for the grid spacing is reduced according the following table:

Area scan grid spacing for different frequency ranges	
Frequency range	Grid spacing
≤ 2 GHz	≤ 15 mm
2 – 4 GHz	≤ 12 mm
4 – 6 GHz	≤ 10 mm

Grid spacing and orientation have no influence on the SAR result. For special applications where the standard scan method does not find the peak SAR within the grid, e.g. mobile phones with flip cover, the grid can be adapted in orientation. Results of this coarse scan are shown in annex B.

- A „zoom scan” measures the field in a volume around the 2D peak SAR value acquired in the previous „coarse“ scan. It uses a fine meshed grid where the robot moves the probe in steps along all the 3 axis (x,y and z-axis) starting at the bottom of the Phantom. The grid spacing for the cube measurement is varied according to the measured frequency range, the dimensions are given in the following table:

Zoom scan grid spacing and volume for different frequency ranges			
Frequency range	Grid spacing for x, y axis	Grid spacing for z axis	Minimum zoom scan volume
≤ 2 GHz	≤ 8 mm	≤ 5 mm	≥ 30 mm
2 – 3 GHz	≤ 5 mm	≤ 5 mm	≥ 28 mm
3 – 4 GHz	≤ 5 mm	≤ 4 mm	≥ 28 mm
4 – 5 GHz	≤ 4 mm	≤ 3 mm	≥ 25 mm
5 – 6 GHz	≤ 4 mm	≤ 2 mm	≥ 22 mm

DASY is also able to perform repeated zoom scans if more than 1 peak is found during area scan. In this document, the evaluated peak 1g and 10g averaged SAR values are shown in the 2D-graphics in annex B. Test results relevant for the specified standard (see section 3) are shown in table form in section 7.

Spatial Peak SAR Evaluation

The spatial peak SAR - value for 1 and 10 g is evaluated after the Cube measurements have been done. The basis of the evaluation are the SAR values measured at the points of the fine cube grid consisting of all points in the three directions x, y and z. The algorithm that finds the maximal averaged volume is separated into three different stages.

- The data between the dipole center of the probe and the surface of the phantom are extrapolated. This data cannot be measured since the center of the dipole is 1 to 2.7 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is about 1 mm (see probe calibration sheet). The extrapolated data from a cube measurement can be visualized by selecting 'Graph Evaluated'.

- The maximum interpolated value is searched with a straight-forward algorithm. Around this maximum the SAR - values averaged over the spatial volumes (1g or 10 g) are computed using the 3d-spline interpolation algorithm. If the volume cannot be evaluated (i.e., if a part of the grid was cut off by the boundary of the measurement area) the evaluation will be started on the corners of the bottom plane of the cube.

- All neighbouring volumes are evaluated until no neighbouring volume with a higher average value is found.

Extrapolation

The extrapolation is based on a least square algorithm [W. Gander, Computermathematik, p.168-180]. Through the points in the first 3 cm along the z-axis, polynomials of order four are calculated. These polynomials are then used to evaluate the points between the surface and the probe tip. The points, calculated from the surface, have a distance of 1 mm from each other.

Interpolation

The interpolation of the points is done with a 3d-Spline. The 3d-Spline is composed of three one-dimensional splines with the "Not a knot"-condition [W. Gander, Computermathematik, p.141-150] (x, y and z -direction) [Numerical Recipes in C, Second Edition, p.123ff].

Volume Averaging

At First the size of the cube is calculated. Then the volume is integrated with the trapezoidal algorithm. 8000 points (20x20x20) are interpolated to calculate the average.

Advanced Extrapolation

DASY uses the advanced extrapolation option which is able to compensate boundary effects on E-field probes.

SAM PHANTOM

The SAM Twin Phantom V4.0 is constructed of a fiberglass shell integrated in a wooden table. The shape of the shell is based on data from an anatomical study designed to determine the maximum exposure in at least 90% of all users. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents the evaporation of the liquid. Reference markings on the Phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot. (see Fig. 2.6)

Phantom Specification

Phantom: SAM Twin Phantom (V4.0)
Shell Material: Vivac Composite
Thickness: 2.0 ± 0.2 mm

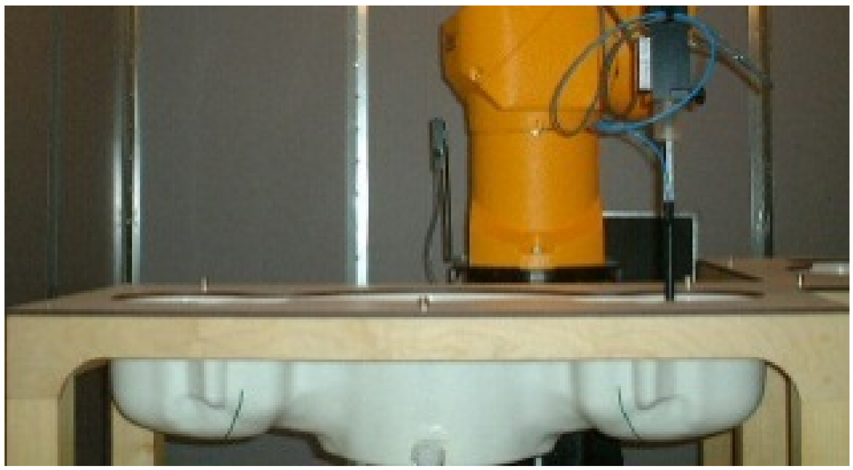


Figure 2.6 SAM Twin Phantom

Device Holder for Transmitters

In combination with the SAM Twin Phantom V4.0 the Mounting Device (see Fig. 2.7), enables the rotation of the mounted transmitter in spherical coordinates whereby the rotation point is the ear opening. The devices can be easily, accurately, and repeat ably be positioned according to the FCC, CENELEC, IEC and IEEE specifications. The device holder can be locked at different phantom locations (left head, right head, flat phantom).

Figure 2.7 Mounting Device

Note: A simulating human hand is not used due to the complex anatomical and geometrical structure of the hand that may produce infinite number of configurations. To produce the worst-case condition (the hand absorbs antenna output power), the hand is omitted during the tests.

3. Probe and Dipole Calibration

See Appendix D and E.

4. Phantom & Simulating Tissue Specifications

Head & Body Simulating Mixture Characterization

The head and body mixtures consist of the material based on the table listed below. The mixture is calibrated to obtain proper dielectric constant (permittivity) and conductivity of the desired tissue. Body tissue parameters that have not been specified in IEEE1528 – 2013 are derived from the issue dielectric parameters computed from the 4-Cole-Cole equations.

Table 4.1 Typical Composition of Ingredients for Tissue

Ingredients		Simulating Tissue						
		750 MHz Body	835 MHz Body	1900 MHz Body	2450 MHz Body	1750 MHz Body	2550 MHz Body	5 GHz Body
Mixing Percentage								
Water		Proprietary Purchased From Speag	52.50	69.91	73.20	Proprietary Purchased From Speag	Proprietary Purchased From Speag	Proprietary Purchased From Speag
Sugar			45.00	0.00	0.00			
Salt			1.40	0.13	0.10			
HEC			1.00	0.00	0.00			
Bactericide			0.10	0.00	0.00			
DGBE			0.00	29.96	26.70			
Dielectric Constant	Target	55.50	55.20	53.30	52.70	53.4	52.57	Various
Conductivity (S/m)	Target	0.96	0.97	1.52	1.95	1.49	2.09	Various

5. ANSI/IEEE C95.1 – 1992 RF Exposure Limits [2]

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.

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.

Table 5.1 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] Head	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.

6. Measurement Uncertainty

Measurement uncertainty table is not required per KDB 865664 D01 v01r04 section 2.8.2 page 12. SAR measurement uncertainty analysis is required in the SAR report only when the highest measured SAR in a frequency band is ≥ 1.5 W/kg for 1-g SAR. The equivalent ratio (1.5/1.6) should be applied to extremity and occupational exposure conditions. The highest reported value is less than 1.5 W/kg. Therefore, the measurement uncertainty table is not required.

7. System Validation

Tissue Verification

Table 7.1 Measured Tissue Parameters

		750 MHz Body		835 MHz Body		1750 MHz Body	
Date(s)		Dec. 1, 2016		Dec. 2, 2016		Dec. 1, 2016	
Liquid Temperature (˚C)	20.0	Target	Measured	Target	Measured	Target	Measured
Dielectric Constant: ε		55.53	55.38	55.20	55.91	53.43	53.27
Conductivity: σ		0.96	0.98	0.97	0.99	1.49	1.51
		1900 MHz Body		2450 MHz Body		2550 MHz Body	
Date(s)		Dec. 2, 2016		Dec. 3, 2016		Dec. 3, 2016	
Liquid Temperature (˚C)	20.0	Target	Measured	Target	Measured	Target	Measured
Dielectric Constant: ε		53.30	52.48	52.70	52.51	52.57	52.40
Conductivity: σ		1.52	1.55	1.95	1.96	2.09	2.11
		5200 MHz Body		5800 MHz Body		1750 MHz Body	
Date(s)		Dec. 5, 2016		Dec. 5, 2016		Aug. 29, 2017	
Liquid Temperature (˚C)	20.0	Target	Measured	Target	Measured	Target	Measured
Dielectric Constant: ε		49.01	48.88	48.20	48.05	53.43	53.32
Conductivity: σ		5.30	5.30	6.00	6.03	1.49	1.52
		835 MHz Body		1900 MHz Body			
Date(s)		May 1, 2018		May 1, 2018			
Liquid Temperature (˚C)	20.0	Target	Measured	Target	Measured		
Dielectric Constant: ε		55.20	54.83	53.30	52.74		
Conductivity: σ		0.97	1.00	1.52	1.55		

See Appendix A for data printout.

Test System Verification

Prior to assessment, the system is verified to the ±10% of the specifications at the test frequency by using the system kit. Power is normalized to 1 watt. (Graphic Plots Attached)

Table 7.2 System Dipole Validation Target & Measured

	Test Frequency	Targeted SAR_{1g} (W/kg)	Measure SAR_{1g} (W/kg)	Tissue Used for Verification	Deviation (%)	Plot Number
01-Dec-2016	750 MHz	8.47	8.52	Body	+ 0.59	1
02-Dec-2016	835 MHz	9.28	9.47	Body	+ 2.05	2
01-Dec-2016	1750 MHz	37.70	38.10	Body	+ 1.06	3
02-Dec-2016	1900 MHz	40.40	40.10	Body	- 0.74	4
03-Dec-2016	2550 MHz	54.80	54.00	Body	- 1.46	5
03-Dec-2016	2450 MHz	52.10	51.90	Body	- 0.38	6
05-Dec-2016	5200 MHz	77.40	78.00	Body	+ 0.78	7
05-Dec-2016	5800 MHz	78.80	79.10	Body	+ 0.38	8
29-Aug-2017	1750 MHz	37.70	38.50	Body	+ 2.12	9
01-May-2018	835 MHz	9.28	9.32	Body	+ 0.43	10
01-May-2018	1900 MHz	40.40	40.50	Body	+ 0.25	11

See Appendix A for data plots.

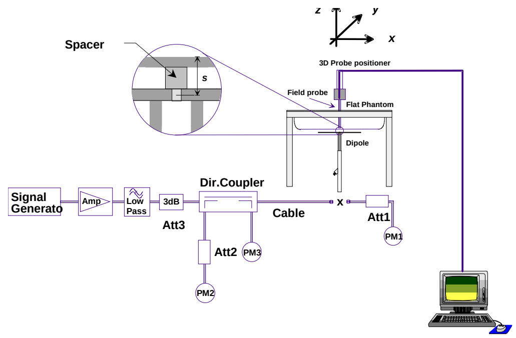


Figure 7.1 Dipole Validation Test Setup

8. LTE Document Checklist

1) Identify the operating frequency range of each LTE transmission band used by the device

LTE Operating Band	Uplink (transmit)	Downlink (Receive)	Duplex mode (FDD/TDD)
	Low - high	Low - high	
2	1850-1910	1930-1990	FDD
4	1710-1755	2110-2155	FDD
5	824-849	869-894	FDD
7	2500-2570	2620-2690	FDD
12	699-716	729-746	FDD
13	777-787	746-756	FDD
17	704-716	734-746	FDD
66	1710-1780	2110-2200	FDD

2) Identify the channel bandwidths used in each frequency band; 1.4, 3, 5, 10, 15, 20 MHz etc

LTE Band Class	Bandwidth (MHz)	Frequency or Freq. Band (MHz)
2	1.4, 3, 5, 10, 15, 20	1850-1910 MHz
4	1.4, 3, 5, 10, 15, 20	1710-1755 MHz
5	1.4, 3, 5, 10	824-849 MHz
7	5,10,15,20	2500-2570 MHz
12	1.4, 3, 5, 10	699-716 MHz
13	5, 10	777-787 MHz
17	5, 10	704-716 MHz
66	1.4, 3, 5, 10, 15, 20	1710-1780 MHz

3) Identify the high, middle and low (H, M, L) channel numbers and frequencies in each LTE frequency band

LTE Band Class	Bandwidth (MHz)	Frequency (MHz)/Channel #					
		Low		Mid		High	
2	1.4	1850.7	18607	1880.0	18900	1909.3	19193
2	3	1851.5	18615	1880.0	18900	1908.5	19185
2	5	1852.5	18625	1880.0	18900	1907.5	19175
2	10	1855.0	18650	1880.0	18900	1905.0	19150
2	15	1857.5	18675	1880.0	18900	1902.5	19125
2	20	1860.0	18700	1880.0	18900	1900.0	19100
4	1.4	1710.7	19957	1732.5	20175	1754.3	20393
4	3	1711.5	19965	1732.5	20175	1753.5	20385
4	5	1712.5	19975	1732.5	20175	1752.5	20375
4	10	1715.0	20000	1732.5	20175	1750.0	20350
4	15	1717.5	20025	1732.5	20175	1747.5	20325
4	20	1720.0	20050	1732.5	20175	1745.0	20300
5	1.4	824.7	20407	836.5	20525	848.3	20643
5	3	825.5	20415	836.5	20525	847.5	20635
5	5	826.5	20425	836.5	20525	846.5	20625
5	10	829.0	20450	836.5	20525	844.0	20600
7	5	2502.5	20775	2535.0	21100	2567.5	21425
7	10	2505.0	20800	2535.0	21100	2565.0	21400
7	15	2507.5	20825	2535.0	21100	2562.5	21375
7	20	2510.0	20850	2535.0	21100	2560.0	21350
12	1.4	699.7	23017	707.5	23095	715.3	23172
12	3	700.5	23025	707.5	23095	714.5	23164
12	5	701.5	23035	707.5	23095	713.5	23154
12	10	704.0	23060	707.5	23095	711.0	23129
13	5	779.5	23205	782.0	23230	784.5	23225
13	10	-----	-----	782.0	23230	-----	-----
17	5	706.5	23755	710.0	23790	713.5	23824
17	10	709.0	23780	710.0	23790	711.0	23799
66	5	1712.5	131997	1755.0	132422	1777.4	132646
66	10	1716.1	132033	1755.0	132422	1774.9	132621
66	15	1717.5	132047	1755.0	132422	1772.4	132596
66	20	1720.0	132072	1755.0	132422	1769.9	132571

4) Specify the UE category and uplink modulations used:
   - UE Category: 3
   - Uplink modulations: QPSK and 16QAM

5) Include descriptions of the LTE transmitter and antenna implementation; and also identify whether it is a standalone transmitter operating independently of other wireless transmitters in the device or sharing hardware components and/or antenna(s) with other transmitters etc

The MIFI7000 has 6 antennas:

- #1 WWAN Main (Transmit and Receive) Antenna (All bands except B7)
- #2 WWAN Main (Transmit and Receive) Antenna (LTE B7)
- #3 and #4 WLAN Main and Aux (Transmit and Receive) Antenna
- #5 Diversity (Receive Only) Antenna (All bands except B7)
- #6 Diversity (Receive Only) Antenna with GPS (Receive Only) capabilities (LTE B7)

Transmission relationship

- All transmission (TX) is limited to the WWAN and WLAN antennas only
- The device is unable to transmit EDGE/GPRS/WCDMA/HSPA and LTE simultaneously.
- The Diversity antenna is receive only antenna which is reserved for the WWAN operation.
- Rx is simultaneous on Main and Diversity
- Simultaneous Tx with the WWAN and WLAN is allows active.

Antenna port	CDMA/EDGE/GPRS/ WCDMA/HSPA		LTE		802.11 b/g/n		GPS
	TX	RX	TX	RX	TX	RX	RX
#1 WWAN Main	**Yes**	**Yes**	**Yes**	**Yes**	No	No	No
#2 WWAN Main	**Yes**	**Yes**	**Yes**	**Yes**	No	No	No
#3 WLAN Main	No	No	No	No	**Yes**	**Yes**	No
#4 WLAN Aux	No	No	No	No	**Yes**	**Yes**	No
#5 (Diversity)	No	**Yes**	No	**Yes**	No	No	No
#6 (Diversity/GPS)	No	**Yes**	No	**Yes**	No	No	**Yes**

6) Identify the LTE voice/data requirements in each operating mode and exposure condition with respect to head and body test configurations, antenna locations, handset flip-cover or slide positions, antenna diversity conditions etc

The MIFI7000 is a data only hotspot device. Data mode was tested in each operating mode and exposure condition in the body configuration. See test setup photos to see all configurations tested.

7) Identify if Maximum Power Reduction (MPR) is optional or mandatory, i.e. built-in by design:

   a) Only mandatory MPR may be considered during SAR testing, when the maximum output power is permanently limited by the MPR implemented within the UE; and only for the applicable RB (resource block) configurations specified in LTE standards

   MPR is mandatory, built-in by design on all production units. It was enabled during testing.

Modulation	Channel Bandwidth/transmission Bandwidth Configuration (RB)						MPR (dB)
	1.4 MHz	3.0 MHZ	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

   b) A-MPR (additional MPR) must be disabled
   c) A-MPR was disabled during testing.

8) Include the maximum average conducted output power measured on the required test channels for each channel bandwidth and UL modulation used in each frequency band:

   The maximum average conducted output power measured for the testing is listed on pages 45-60 of this report. The below table shows the factory set point with the allowable tolerance.

Band	Technology	Class	3GPP Nominal Power dBm	Calibrated Nominal Power dBm	Tolerance dBm	Lower Tolerance dBm	Upper Tolerance dBm
Band 2 – 1900 MHz	LTE	3	23.0	23.0	+0.5/-1.7	21.3	23.5
Band 4 – 1750 MHz	LTE	3	23.0	23.0	+0.5/-1.7	21.3	23.5
Band 5 – 835 MHz	LTE	3	23.0	23.0	+1.0/-1.7	21.3	24.0
Band 12 – 750 MHz	LTE	3	23.0	23.0	+0.5/-1.7	21.3	23.5
Band 13 – 750 MHz	LTE	3	23.0	23.0	+0.5/-1.7	21.3	23.5
Band 17 – 750 MHz	LTE	3	23.0	23.0	+0.5/-1.7	21.3	23.5
Band 66 – 1750 MHz	LTE	3	23.0	23.0	+0.5/-1.7	21.3	23.5
Band 7 – 2550 MHz	LTE	3	23.0	23.0	+0.5/-1.7	21.3	23.5

9) Identify all other U.S. wireless operating modes (3G, Wi-Fi, WiMax, Bluetooth etc), device/exposure configurations (head and body, antenna and handset flip-cover or slide positions, antenna diversity conditions etc.) and frequency bands used for these modes

Other wireless modes:

Band	Technology	Class	3GPP Nominal Power dBm	Calibrated Nominal Power dBm	Tolerance dBm	Lower Tolerance dBm	Upper Tolerance dBm
Band 2 – 1900 MHz	CDMA/EvDo	3	23.0	23.0	+0.5/-2.0	21.0	23.5
Band 5 – 850 MHz	CDMA/EvDo	3	23.0	23.0	+0.5/-2.0	21.0	23.5
Band 2 – 1900 MHz	WCDMA/HSPA	3	23.0	23.0	+0.5/-2.0	21.0	23.5
Band 4 – 1750 MHz	WCDMA/HSPA	3	23.0	23.0	+0.5/-2.0	21.0	23.5
Band 5 – 850 MHz	WCDMA/HSPA	3	23.0	23.0	+0.5/-2.0	21.0	23.5
Band 5 – 850 MHz	GPRS	4	33.0	32.0	+2.0/-1.0	31.0	34.0
Band 5 – 850 MHz	EDGE	E2	27.0	26.5	±1.5	25.0	28.0
Band 2 – 1900 MHz	GPRS	1	30.0	29.5	±1.5	28.0	31.0
Band 2 – 1900 MHz	EDGE	E2	26.0	25.5	±1.5	24.0	27.0
WLAN – 2.4 GHz	802.11b	N/A	N/A	14	±4.0	10	18
WLAN – 2.4 GHz	802.11g/n	N/A	N/A	11	±4.0	7	15
WLAN – 5.2 GHz	802.11an/ac	N/A	N/A	8	±4.0	4	12
WLAN – 5.8 GHz	802.11an/ac	N/A	N/A	16	±4.0	12	20

10) Include the maximum average conducted output power measured for the other wireless modes and frequency bands.

The maximum average conducted output power measured for the testing is listed on pages 29-40 of this report. The table in item 9 shows the factory set point with the allowable tolerance.

11) Identify the simultaneous transmission conditions for the voice and data configurations supported by all wireless modes, device configurations and frequency bands, for the head and body exposure conditions and device operating configurations (handset flip or cover positions, antenna diversity conditions etc.)

The device is unable to transmit WCDMA/GPRS/EDGE/CDMA and LTE simultaneously.

The MIFI7000 is able to transmit WWAN and WLAN simultaneously.

TX Modes	WCDMA/GPRS/EDGE/CDMA	LTE	802.11 b/g/n
1	**ON**	OFF	**ON**
2	OFF	**ON**	**ON**

12) When power reduction is applied to certain wireless modes to satisfy SAR compliance for simultaneous transmission conditions, other equipment certification or operating requirements, include the maximum average conducted output power measured in each power reduction mode applicable to the simultaneous voice/data transmission configurations for such wireless configurations and frequency bands; and also include details of the power reduction implementation and measurement setup

    Power reduction is not required to satisfy SAR compliance.

13) Include descriptions of the test equipment, test software, built-in test firmware etc. required to support testing the device when power reduction is applied to one or more transmitters/antennas for simultaneous voice/data transmission

    Power reduction is not required to satisfy SAR compliance.

14) When appropriate, include a SAR test plan proposal with respect to the above

    Power reduction is not required to satisfy SAR compliance.

15) If applicable, include preliminary SAR test data and/or supporting information in laboratory testing inquiries to address specific issues and concerns or for requesting further test reduction considerations appropriate for the device; for example, simultaneous transmission configurations.

    Not applicable.

9. SAR Test Data Summary

See Measurement Result Data Pages

See Appendix B for SAR Test Data Plots.
See Appendix C for SAR Test Setup Photos.

Procedures Used To Establish Test Signal

The device was either placed into simulated transmit mode using the manufacturer's test codes or the actual transmission is activated through a base station simulator or similar equipment. See data pages for actual procedure used in measurement.

Device Test Condition

In order to verify that the device was tested at full power, conducted output power measurements were performed before and after each SAR measurement to confirm the output power unless otherwise noted. If a conducted power deviation of more than 5% occurred, the test was repeated. The power drift of each test is measured at the start of the test and again at the end of the test. The drift percentage is calculated by the formula ((end/start)-1)*100 and rounded to three decimal places. The drift percentage is calculated into the resultant SAR value on the data sheet for each test.

The testing was conducted on all edges closest to each antenna. Side A, Side B, Side C, Side D and Side E testing was conducted for the WWAN antenna. The Side F was not tested as the WWAN antenna was more than 2.5 cm from this side. The Side A, Side B, Side C and Side D were tested for the WLAN antennas. Side E and Side F were not tested as the antenna was more than 2.5 cm from these sides. All further test reductions are shown on pages 42-43 for GSM/WCDMA bands, page 36-41 for WLAN and pages 61-81 for LTE bands. All testing was conducted per KDB 941225 D06. See the photo in Appendix C for a pictorial of the setups, labeling of the sides tested and antenna locations.

This device is capable of operating in 850/1900 GPRS/EDGE frequency bands. In GPRS mode, the device is in Class 4 for 850 MHz and Class 1 for 1900 MHz. In EDGE mode, the device is in Class E2 for 850/1900 MHz. The testing was conducted in the GPRS mode. The GPRS mode has 1-slot, 2-slot, 3-slot and 4-slot configurations. The power measured is peak power. The average power in all GPRS Slots calculated and the 1-slot had the highest average power. Therefore, the testing was conducted in 1-Slot. The EDGE mode is >5 dB lower than its equivalent slot configuration for GPRS. Therefore, the device was only tested in the highest power configuration which was 1-slot GPRS.

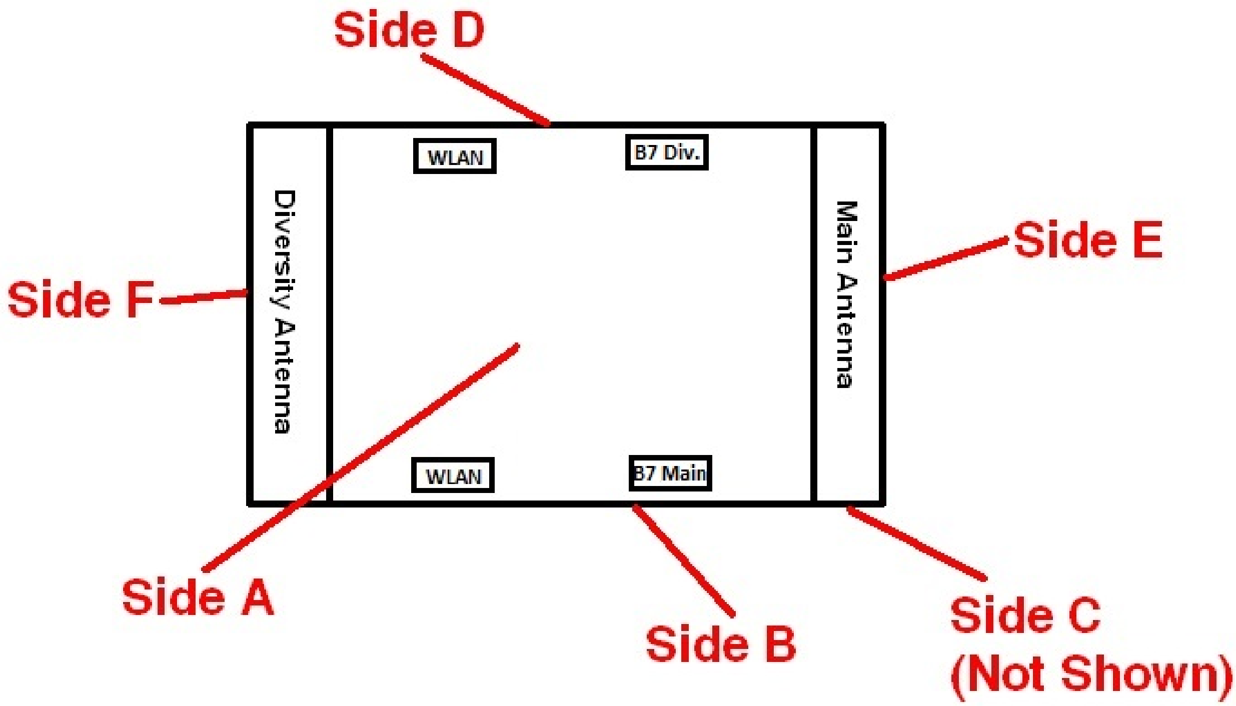
The WCDMA testing was conducted using 12.2 kbps RMC configured in Test Loop Mode 1. The HSPA testing was conducted with HS-DPCCH, E-DPCCH and E-DPDCH all enabled and a 12.2 kbps RMC. FRC was configured according to HS-DPCCH Sub-Test 1 using H-set 1 and QPSK.

The 1xRTT testing was conducted in RC3 with the device configured using TDSO/SO32 with FCH transmitting at full rate. The power control was set to "All Bits Up." 1xRTT did not require SAR testing due to the measured power being less than ¼ dB higher than Rev. 0.

The Rev. 0 testing was conducted with the Reverse Data Channel rate of 153.6 kbps. The Forward Traffic Channel data rate is set to the 2-slot version of 307.2 kbps with the ACK Channel transmitting in all slots. The power control was set to “All Bits Up.” Other rates were not tested due to the conducted power measured was less than ¼ dB higher than 153.6 kbps.

The Rev. A Subtype 2 testing was conducted with the Reverse Data Channel payload size of 4096 bits and Termination Target of 16 slots. The Forward Traffic Channel data rate is set to the 2-slot version of 307.2 kbps with the ACK Channel transmitting in all slots. The power control was set to “All Bits Up.” Rev. A did not require SAR testing due to the measured power being less than ¼ dB higher than Rev. 0.

Figure 10.1
SAR Location Diagram of Modem Testing



Antenna Distances

WWAN main to WLAN (Chain 0) (mm):	52 mm
WWAN main to WLAN (Chain 1) (mm):	55 mm
WWAN main band 7 to WLAN (Chain 0) (mm):	20 mm
WWAN main band 7 to WLAN (Chain 1) (mm):	55 mm

10. FCC 3G Measurement Procedures

Power measurements were performed using a base station simulator under average power.

10.1 Procedures Used to Establish RF Signal for SAR

The device was placed into a simulated call using a base station simulator in a screen room. Such test signals offer a consistent means for testing SAR and recommended for evaluating SAR. The SAR measurement software calculates a reference point at the start and end of the test to check for power drifts. If conducted power deviations of more than 5% occurred, the tests were repeated.

10.2 SAR Measurement Conditions for CDMA2000, 1xEV-DO

10.2.1 Output Power Verification 1xRTT

Use CDMA2000 Rev 6 protocol in the call box.

1) Test for RC 3 Reverse FCH, RC3 Reverse SCH0 and demodulation of RC 3, 4 and 5.
    a. Set up a call using Supplemental Channel Test Mode 3 (RC 3, SO 32) with 9600 bps Fundamental Channel and 9600 bps SCH0 data rate.
    b. As per C.S0011 or TIA/EIA-98-F Table 4.4.5.2-2, set the test parameters.
    c. Send alternating ‘0’ and ‘1’ power control bit to the device
    d. Determine the active channel configuration. If the desired channel configuration is not the active channel configuration, increase Îor by 1 dB and repeat the verification. Repeat this step until the desired channel configuration becomes active.
    e. Measure the output power at the device antenna connector.
    f. Decrease Îor by 0.5 dB.
    g. Determine the active channel configuration. If the active channel configuration is the desired channel configuration, measure the output power at the device antenna connector.
    h. Repeat step f and g until the output power no longer increases or the desired channel configuration is no longer active. Record the highest output power achieved with the desired channel configuration active.
    i. Repeat step a through h ten times and average the result.

10.2.2 Output Power Verification 1xEvDo

1) Use 1xEV-DO Rel 0 protocol in the call box 8960.
    a. FTAP
        - Select Test Application Protocol to FTAP
        - Set FTAP Rate to 307.2 kbps (2 Slot, QPSK)
        - Generator Info -> Termination Parameters -> Max Forward Packet Duration -> 16 Slots
        - Set Îor to -60 dBm/1.23 MHz
        - Send continuously ‘0’ power control bits
        - Measure the power at device antenna connector
    b. RTAP
        - Select Test Application Protocol to RTAP
        - Set RTAP Rate to 9.6 kbps

- Generator Info -> Termination Parameters -> Max Forward Packet Duration -> 16 Slots
- Set Îor to -60 dBm/1.23 MHz
- Send continuously '0' power control bits
- Measure the power at device antenna connector
- Repeat above steps for RTAP Rate = 19.2 kbps, 38.4 kbps, 76.8 kbps and 153.6 kbps respectively

2) Use 1xEV-DO Rev A protocol in the call box 8960

a. FETAP

- Select Test Application Protocol to FETAP
- Set FETAP Rate to 307.2 kbps (2 Slot, QPSK)
- Generator Info -> Termination Parameters -> Max Forward Packet Duration -> 16 Slots
- Set Îor to -60 dBm/1.23 MHz
- Send continuously '0' power control bits
- Measure the power at device antenna connector

b. RETAP

- Select Test Application Protocol to RETAP
- F-Traffic Format -> 4 (1024, 2, 128) Canonical (307.2k, QPSK) • Set R-Data Pkt Size to 128
- Protocol Subtype Config -> Release A Physical Layer Subtype -> Subtype 2 ->PL Subtype 2 Access Channel MAC Subtype -> Default (Subtype 0)
- Generator Info -> Termination Parameters -> Max Forward Packet Duration -> 16 Slots ->ACK R-Data After -> Subpacket 0 (All ACK)
- Set Îor to -60 dBm/1.23 MHz
- Send continuously '0' power control bits
- Measure the power at device antenna connector
- Repeat above steps for R-Data Pkt Size = 256, 512, 768, 1024, 1536, 2048, 3072, 4096, 6144, 8192, 12288 respectively.

		IS-2000	1Xev-Do Rev. 0	1Xev-Do Rev. A Subtype 0/1
	Channel	**TDSO SO32 RC3**	**RTAP [dBm]**	**RTAP [dBm]**
Cellular	1013	23.86	23.76	23.53
	384	23.56	23.66	23.52
	777	23.63	23.41	23.39
PCS	25	23.87	22.85	22.78
	600	23.16	23.15	23.01
	1175	22.65	22.63	22.52

CDMA Power Measurements
Power Control was set in "All Bits Up" for all measurements.

10.3 SAR Measurement Conditions for WCDMA/HSDPA/HSUPA

Configure the call box 8960 to support all WCDMA tests in respect to the 3GPP 34.121 (listed in Table below). Measure the power at Ch4132, 4182 and 4233 for US cell; Ch9262, 9400 and 9538 for US PCS band.

For Rel99

- Set a Test Mode 1 loop back with a 12.2kbps Reference Measurement Channel (RMC).
- Set and send continuously Up power control commands to the device
- Measure the power at the device antenna connector using the power meter with average detector.

For HSDPA Rel 6

- Establish a Test Mode 1 look back with both 1 12.2kbps RMC channel and a H-Set1 Fixed Reference Channel (FRC). With the 8960 this is accomplished by setting the signal Channel Coding to "Fixed Reference Channel" and configuring for HSET-1 QKSP.
- Set beta values and HSDPA settings for HSDPA Subtest1 according to Table below.
- Send continuously Up power control commands to the device
- Measure the power at the device antenna connector using the power meter with modulated average detector.
- Repeat the measurement for the HSDPA Subtest2, 3 and 4 as given in Table below.

For HSUPA Rel 6

- Use UL RMC 12.2kbps and FRC H-Set1 QPSK, Test Mode 1 loop back. With the 8960 this is accomplished by setting the signal Channel Coding to "E-DCH Test Channel" and configuring the equipment category to Cat5_10ms.
- Set the Absolute Grant for HSUPA Subtest1 according to Table below.
- Set the device power to be at least 5dB lower than the Maximum output power
- Send power control bits to give one TPC_cmd = +1 command to the device. If device doesn't send any E-DPCH data with decreased E-TFCI within 500ms, then repeat this process until the decreased E-TFCI is reported.
- Confirm that the E-TFCI transmitted by the device is equal to the target E-TFCI in Table below. If the E-TFCI transmitted by the device is not equal to the target E-TFCI, then send power control bits to give one TPC_cmd = -1 command to the UE. If UE sends any E-DPCH data with decreased E-TFCI within 500 ms, send new power control bits to give one TPC_cmd = -1 command to the UE. Then confirm that the E-TFCI transmitted by the UE is equal to the target E-TFCI in Table below.
- Measure the power using the power meter with modulated average detector.
- Repeat the measurement for the HSUPA Subtest2, 3, 4 and 5 as given in Table below.

10.2 SAR Measurement Conditions for GSM

Configure the 8960 box to support GMSK and 8PSK call respectively, and set one timeslot and two timeslot transmission for GMSK GSM/GPRS and 8PSK EDGE. Measure and record power outputs for both modulations.

3GPP Release Version	Mode	Cellular Band [dBm]			Sub-Test (See Table Below)	MPR
		4132	4183	4233		
99	WCDMA	23.42	23.13	23.16	-	-
6	HSDPA	23.36	23.07	23.09	1	0
6		23.32	23.09	23.05	2	0
6		22.99	22.92	22.89	3	0.5
6		22.94	22.99	22.90	4	0.5
6	HSUPA	23.40	23.10	23.13	1	0
6		21.45	21.49	21.46	2	2
6		22.47	22.48	22.49	3	1
6		21.46	21.41	21.44	4	2
6		23.32	23.04	23.07	5	0

3GPP Release Version	Mode	PCS Band [dBm]			Sub-Test (See Table Below)	MPR
		9262	9400	9538		
99	WCDMA	23.05	23.02	23.38	-	-
6	HSDPA	23.02	23.00	23.31	1	0
6		23.01	22.99	23.28	2	0
6		22.56	22.52	22.66	3	0.5
6		22.41	22.31	22.52	4	0.5
6	HSUPA	23.00	22.98	23.21	1	0
6		21.07	21.01	21.12	2	2
6		22.06	22.05	22.23	3	1
6		20.99	20.95	22.03	4	2
6		22.89	22.91	23.05	5	0

3GPP Release Version	Mode	AWS Band [dBm]			Sub-Test (See Table Below)	MPR
		1312	1413	1513		
99	WCDMA	22.19	23.50	23.26	-	-
6	HSDPA	22.02	23.25	23.21	1	0
6		22.01	23.22	23.19	2	0
6		21.56	22.95	22.86	3	0.5
6		21.41	22.91	22.85	4	0.5
6	HSUPA	22.00	22.98	23.19	1	0
6		20.07	21.61	21.22	2	2
6		21.06	22.65	22.33	3	1
6		19.99	20.55	21.35	4	2
6		21.89	23.41	23.22	5	0

Sub-Test Setup for Release 6 HSDPA

Sub-Test	β_c	β_d	B_c/β_d	β_{hs}
1	2/15	15/15	2/15	4/15
2	12/15	15/15	15/15	24/15
3	15/15	8/15	15/8	30/15
4	15/15	4/15	15/4	30/15
Δ_{ack}, Δ_{nack} and Δ_{cqi} = 8				

Sub-Test Setup for Release 6 HSUPA

Sub-Test	β_c	β_d	B_c/β_d	β_{hs}	B_{ec}	B_{ed}	MPR	AG Index	E-TFCI
1	11/15	15/15	11/15	22/15	209/225	1039/225	0.0	20	75
2	6/15	15/15	6/15	12/15	12/15	94/75	2.0	12	67
3	15/15	9/15	15/9	30/15	30/15	47/15	1.0	15	92
4	2/15	15/15	2/15	4/15	2/15	56/15	2.0	17	71
5	15/15	15/15	15/15	30/15	24/15	134/15	0.0	21	81
Δ_{ack}, Δ_{nack} and Δ_{cqi} = 8									

GPRS-GMSK/1 slot			
Band	Channel	Peak Power	Frame Average
Cellular	128	32.17	23.14
	190	32.15	23.12
	251	32.27	23.24
PCS	512	29.49	20.46
	661	29.52	20.49
	810	29.59	20.56

GPRS-GMSK/2 slot			
Band	Channel	Peak Power	Frame Average
Cellular	128	29.68	23.66
	190	29.60	23.58
	251	29.48	23.46
PCS	512	26.64	20.62
	661	26.72	20.70
	810	26.47	20.45

GPRS-GMSK/3 slot			
Band	Channel	Peak Power	Frame Average
Cellular	128	27.24	22.98
	190	27.57	23.31
	251	27.38	23.12
PCS	512	25.15	20.89
	661	25.11	20.85
	810	24.69	20.43

GPRS-GMSK/4 slot			
Band	Channel	Peak Power	Frame Average
Cellular	128	26.70	23.69
	190	26.61	23.60
	251	26.37	23.36
PCS	512	23.98	20.97
	661	24.08	21.07
	810	23.61	20.60

EDGE-8PSK/1 slot			
Band	Channel	Peak Power	Frame Average
Cellular	128	26.65	17.62
	190	26.56	17.53
	251	26.51	17.48
PCS	512	25.95	16.92
	661	26.05	17.02
	810	25.86	16.83

EDGE-8PSK/2 slot			
Band	Channel	Peak Power	Frame Average
Cellular	128	23.61	17.59
	190	23.58	17.56
	251	23.49	17.47
PCS	512	23.34	17.32
	661	23.31	17.29
	810	23.13	17.11

EDGE-8PSK/3 slot			
Band	Channel	Peak Power	Frame Average
Cellular	128	21.77	17.51
	190	21.70	17.44
	251	21.57	17.31
PCS	512	21.55	17.29
	661	21.56	17.30
	810	21.31	17.05

EDGE-8PSK/4 slot			
Band	Channel	Peak Power	Frame Average
Cellular	128	20.80	17.79
	190	20.72	17.71
	251	20.60	17.59
PCS	512	20.25	17.24
	661	20.32	17.31
	810	20.01	17.00

Conducted TxPout_Max			FID=>	SZ17061900010							
Mode	DataRate (Mbps)	Channel (L/M/H)	Frequency (MHz)	TUP (dBm)	Tx1 TxAvg (dBm)	Tx1 TxPk (dBm)	TeraTerm TxPwr Set	TUP (dBm)	Tx2 TxAvg (dBm)	Tx2 TxPk (dBm)	TeraTerm TxPwr Set
2.4GHz 802.11b / 20MHz BW	HT20 1Mbps DataRate	1	2412	18.0	18.0	20.9	18.0	18.0	18.0	21.0	18.0
		6	2437	18.0	18.0	21.0	17.0	18.0	17.2	20.0	20.0
		11	2462	18.0	17.9	20.6	20.0	18.0	17.2	20.4	17.0
	HT20 2Mbps DataRate	1	2412	18.0	17.8	20.7	18.0	18.0	16.8	19.9	17.0
		6	2437	18.0	17.8	20.8	17.0	18.0	17.3	20.1	20.0
		11	2462	18.0	17.9	20.5	20.0	18.0	17.3	20.4	17.0
	HT20 5.5Mbps DataRate	1	2412	18.0	17.8	20.7	18.0	18.0	17.3	20.2	17.0
		6	2437	18.0	17.8	20.9	17.0	18.0	18.0	20.1	20.0
		11	2462	18.0	16.8	19.6	20.0	18.0	17.7	20.6	17.0
	HT20 11Mbps DataRate	1	2412	18.0	17.6	20.9	18.0	18.0	18.0	21.2	18.0
		6	2437	18.0	17.4	20.8	17.0	18.0	17.1	20.1	20.0
		11	2462	18.0	17.7	20.6	20.0	18.0	17.0	20.4	17.0
2.4GHz 802.11g / 20MHz BW	6Mbps DataRate	1	2412	15.0	14.5	23.3	14.0	15.0	14.5	23.0	14.0
		6	2437	15.0	14.6	23.1	13.0	15.0	14.6	21.9	17.0
		11	2462	15.0	14.8	22.7	16.0	15.0	14.7	23.0	14.0
	9Mbps DataRate	1	2412	15.0	14.5	23.3	14.0	15.0	14.4	23.1	14.0
		6	2437	15.0	14.5	23.2	13.0	15.0	14.4	21.9	17.0
		11	2462	15.0	14.8	22.7	16.0	15.0	14.5	23.0	14.0
	12Mbps DataRate	1	2412	15.0	14.4	23.3	14.0	15.0	15.0	23.6	15.0
		6	2437	15.0	14.3	23.2	13.0	15.0	14.0	21.7	17.0
		11	2462	15.0	14.4	22.5	16.0	15.0	14.3	23.1	14.0
	18Mbps DataRate	1	2412	15.0	14.7	23.3	15.0	15.0	14.9	23.5	15.0
		6	2437	15.0	14.6	23.2	14.0	15.0	14.9	22.1	18.0
		11	2462	15.0	14.8	22.9	17.0	15.0	15.0	23.4	15.0
	24Mbps DataRate	1	2412	15.0	14.4	23.4	15.0	15.0	14.1	23.3	15.0
		6	2437	15.0	14.3	23.0	14.0	15.0	14.4	21.9	18.0
		11	2462	15.0	14.5	22.8	17.0	15.0	14.3	23.3	15.0
	36Mbps DataRate	1	2412	15.0	14.9	23.9	16.0	15.0	14.8	23.8	16.0
		6	2437	15.0	14.8	23.7	14.0	15.0	15.0	22.0	19.0
		11	2462	15.0	14.1	22.7	17.0	15.0	14.2	23.5	15.0
	48Mbps DataRate	1	2412	15.0	14.7	23.8	16.0	15.0	14.5	23.7	16.0
		6	2437	15.0	14.6	23.6	15.0	15.0	14.9	22.1	19.0
		11	2462	15.0	14.9	22.9	18.0	15.0	14.8	23.6	15.0
	54Mbps DataRate	1	2412	15.0	14.6	23.6	16.0	15.0	14.5	23.7	16.0
		6	2437	15.0	14.6	23.2	15.0	15.0	14.6	22.3	19.0
		11	2462	15.0	14.7	22.7	18.0	15.0	14.7	23.5	15.0
2.4GHz 802.11n / 20MHz BW	MCS0 7.2Mbps DataRate	1	2412	15.0	14.7	23.0	14.0	15.0	14.3	23.1	14.0
		6	2437	15.0	14.7	23.0	13.0	15.0	14.7	21.9	19.0
		11	2462	15.0	14.9	22.6	16.0	15.0	14.6	23.0	14.0
	MCS1 14.4Mbps DataRate	1	2412	15.0	14.2	23.1	14.0	15.0	14.9	23.4	15.0
		6	2437	15.0	15.0	23.2	14.0	15.0	14.9	21.9	18.0
		11	2462	15.0	14.4	22.5	16.0	15.0	15.0	23.4	15.0
	MCS2 21.7Mbps DataRate	1	2412	15.0	14.2	23.1	14.0	15.0	14.9	23.5	15.0
		6	2437	15.0	15.0	23.2	14.0	15.0	15.0	22.1	18.0
		11	2462	15.0	14.3	22.6	16.0	15.0	15.0	23.4	15.0
	MCS3 28.9Mbps DataRate	1	2412	15.0	14.4	23.4	15.0	15.0	15.0	23.6	16.0
		6	2437	15.0	14.2	23.1	14.0	15.0	14.4	22.2	18.0
		11	2462	15.0	14.5	22.9	16.0	15.0	14.4	23.4	15.0
	MCS4 43.3Mbps DataRate	1	2412	15.0	14.2	23.4	15.0	15.0	15.0	23.7	16.0
		6	2437	15.0	14.9	23.5	15.0	15.0	14.3	22.0	18.0
		11	2462	15.0	14.3	22.6	17.0	15.0	15.0	23.5	16.0
	MCS5 57.8Mbps DataRate	1	2412	15.0	14.7	23.8	16.0	15.0	14.5	23.7	16.0
		6	2437	15.0	14.6	23.4	15.0	15.0	14.7	22.3	18.0
		11	2462	15.0	14.9	23.0	18.0	15.0	14.6	23.5	16.0
	MCS6 65.0Mbps DataRate	1	2412	15.0	14.7	23.7	16.0	15.0	14.4	23.7	16.0
		6	2437	15.0	14.6	23.5	15.0	15.0	14.8	22.3	18.0
		11	2462	15.0	14.7	23.0	18.0	15.0	14.7	23.5	16.0
	MCS7 72.2Mbps DataRate	1	2412	15.0	14.4	23.6	16.0	15.0	14.3	23.7	16.0
		6	2437	15.0	14.2	23.3	15.0	15.0	14.6	22.3	18.0
		11	2462	15.0	14.6	23.1	18.0	15.0	14.5	23.6	16.0

Conducted TxPout_Max			FID=>	SZ17061900010							
Mode	DataRate (Mbps)	Channel (L/M/H)	Frequency (MHz)	TUP (dBm)	Tx1 TxAvg (dBm)	Tx1 TxPk (dBm)	TeraTerm TxPwr Set	TUP (dBm)	Tx2 TxAvg (dBm)	Tx2 TxPk (dBm)	TeraTerm TxPwr Set
5.2GHz 802.11n / 20MHz BW	MCS0 7.2Mbps DataRate	36	5180	10.0	10.0	19.1	10.0	12.0	11.3	20.1	12.0
		40	5200	10.0	9.7	18.9	10.0	12.0	11.6	20.4	12.0
		44	5220	10.0	9.3	18.4	9.0	12.0	11.9	20.8	12.0
		48	5240	10.0	10.0	19.1	10.0	12.0	11.8	20.6	12.0
	MCS1 14.4Mbps DataRate	36	5180	10.0	9.7	19.0	10.0	12.0	11.0	20.2	12.0
		40	5200	10.0	9.4	18.7	10.0	12.0	11.3	20.4	12.0
		44	5220	10.0	9.0	18.4	9.0	12.0	11.6	20.7	12.0
		48	5240	10.0	9.7	18.9	10.0	12.0	11.6	20.7	12.0
	MCS2 21.7Mbps DataRate	36	5180	10.0	9.4	19.0	10.0	12.0	11.9	20.3	13.0
		40	5200	10.0	9.2	18.7	10.0	12.0	12.0	20.7	13.0
		44	5220	10.0	9.8	18.2	10.0	12.0	11.5	20.8	12.0
		48	5240	10.0	9.4	19.0	10.0	12.0	11.4	20.7	12.0
	MCS3 28.9Mbps DataRate	36	5180	10.0	10.0	19.8	11.0	12.0	11.4	20.4	13.0
		40	5200	10.0	9.8	19.5	11.0	12.0	11.6	20.7	13.0
		44	5220	10.0	9.4	19.1	10.0	12.0	12.0	21.1	13.0
		48	5240	10.0	10.0	19.9	11.0	12.0	11.9	20.8	13.0
	MCS4 43.3Mbps DataRate	36	5180	10.0	9.7	19.7	11.0	12.0	11.1	20.5	13.0
		40	5200	10.0	9.4	19.3	11.0	12.0	11.5	20.7	13.0
		44	5220	10.0	9.0	19.0	10.0	12.0	11.8	21.0	13.0
		48	5240	10.0	9.7	19.7	11.0	12.0	11.6	20.8	13.0
	MCS5 57.8Mbps DataRate	36	5180	10.0	9.4	19.7	11.0	12.0	11.8	20.5	14.0
		40	5200	10.0	9.2	19.4	11.0	12.0	11.0	20.6	13.0
		44	5220	10.0	9.8	20.1	11.0	12.0	11.3	20.9	13.0
		48	5240	10.0	9.5	19.8	11.0	12.0	11.2	20.8	13.0
	MCS6 65.0Mbps DataRate	36	5180	10.0	9.4	19.6	11.0	12.0	11.8	20.5	14.0
		40	5200	10.0	9.2	19.5	11.0	12.0	12.0	20.8	14.0
		44	5220	10.0	9.6	20.0	11.0	12.0	11.3	20.8	13.0
		48	5240	10.0	9.3	19.6	11.0	12.0	11.2	20.9	13.0
	MCS7 72.2Mbps DataRate	36	5180	10.0	9.2	19.6	11.0	12.0	11.6	20.6	14.0
		40	5200	10.0	10.0	20.4	12.0	12.0	11.8	20.7	14.0
		44	5220	10.0	9.7	20.0	11.0	12.0	11.2	21.0	13.0
		48	5240	10.0	9.3	19.7	11.0	12.0	12.0	20.9	14.0
5.2GHz 802.11n / 40MHz BW	MCS0 15.0Mbps DataRate	38	5190	10.0	9.3	18.5	9.0	12.0	11.6	20.5	12.0
		46	5230	10.0	9.3	18.5	9.0	12.0	11.7	20.6	12.0
	MCS1 30.0Mbps DataRate	38	5190	10.0	9.9	19.3	10.0	12.0	11.4	20.6	12.0
		46	5230	10.0	10.0	19.5	10.0	12.0	11.5	20.6	12.0
	MCS2 45.0Mbps DataRate	38	5190	10.0	9.7	19.2	10.0	12.0	11.3	20.6	12.0
		46	5230	10.0	9.7	19.2	10.0	12.0	11.2	20.6	12.0
	MCS3 60.0Mbps DataRate	38	5190	10.0	9.3	19.1	10.0	12.0	11.7	20.8	13.0
		46	5230	10.0	9.3	19.1	10.0	12.0	11.8	20.8	13.0
	MCS4 90.0Mbps DataRate	38	5190	10.0	10.0	20.0	11.0	12.0	11.6	20.8	13.0
		46	5230	10.0	10.0	20.0	11.0	12.0	11.6	20.8	13.0
	MCS5 120.0Mbps DataRate	38	5190	10.0	9.8	20.0	11.0	12.0	11.3	20.8	13.0
		46	5230	10.0	9.9	20.0	11.0	12.0	11.3	20.8	13.0
	MCS6 135.0Mbps DataRate	38	5190	10.0	9.6	20.0	11.0	12.0	11.3	20.8	13.0
		46	5230	10.0	9.8	20.2	11.0	12.0	11.3	20.8	13.0
	MCS7 150.0Mbps DataRate	38	5190	10.0	9.7	20.0	11.0	12.0	11.1	20.8	13.0
		46	5230	10.0	9.5	19.8	11.0	12.0	11.0	20.8	13.0

Conducted TxPout_Max			FID=>	SZ17061900010							
Mode	DataRate (Mbps)	Channel (L/M/H)	Frequency (MHz)	TUP (dBm)	Tx1 TxAvg (dBm)	Tx1 TxPk (dBm)	TeraTerm TxPwr Set	TUP (dBm)	Tx2 TxAvg (dBm)	Tx2 TxPk (dBm)	TeraTerm TxPwr Set
5.2GHz 802.11ac / 20MHz BW	MCS0 7.2Mbps DataRate	36.0	5180.0	12.0	12.0	21.4	12.0	10.0	9.5	18.9	10.0
		40.0	5200.0	12.0	12.0	21.1	12.0	10.0	9.8	18.9	10.0
		44.0	5220.0	12.0	11.5	20.5	11.0	10.0	9.1	18.3	9.0
		48.0	5240.0	12.0	12.0	20.9	12.0	10.0	9.7	19.2	10.0
	MCS1 14.4Mbps DataRate	36.0	5180.0	12.0	12.0	21.5	12.0	10.0	9.2	18.6	10.0
		40.0	5200.0	12.0	11.7	20.8	12.0	10.0	9.5	19.0	10.0
		44.0	5220.0	12.0	11.0	20.4	11.0	10.0	9.9	19.5	10.0
		48.0	5240.0	12.0	11.8	20.9	12.0	10.0	9.6	19.4	10.0
	MCS2 21.7Mbps DataRate	36.0	5180.0	12.0	11.5	21.4	12.0	10.0	9.8	20.0	11.0
		40.0	5200.0	12.0	11.5	21.1	12.0	10.0	10.0	20.1	11.0
		44.0	5220.0	12.0	12.0	21.5	12.0	10.0	9.7	19.6	10.0
		48.0	5240.0	12.0	11.6	21.1	12.0	10.0	9.1	19.2	10.0
	MCS3 28.9Mbps DataRate	36.0	5180.0	12.0	11.2	21.1	12.0	10.0	9.6	19.8	11.0
		40.0	5200.0	12.0	11.9	21.9	13.0	10.0	9.8	19.6	11.0
		44.0	5220.0	12.0	11.4	21.0	12.0	10.0	9.2	19.1	10.0
		48.0	5240.0	12.0	12.0	21.8	13.0	10.0	9.8	20.2	11.0
	MCS4 43.3Mbps DataRate	36.0	5180.0	12.0	11.0	21.0	12.0	10.0	9.2	19.7	11.0
		40.0	5200.0	12.0	11.8	21.8	13.0	10.0	9.5	19.6	11.0
		44.0	5220.0	12.0	12.0	22.1	13.0	10.0	9.7	19.9	11.0
		48.0	5240.0	12.0	11.9	21.6	13.0	10.0	9.5	19.9	11.0
	MCS5 57.8Mbps DataRate	36.0	5180.0	12.0	11.6	22.0	13.0	10.0	9.8	20.3	12.0
		40.0	5200.0	12.0	11.3	21.4	13.0	10.0	9.2	19.4	11.0
		44.0	5220.0	12.0	11.7	21.9	13.0	10.0	9.4	20.1	11.0
		48.0	5240.0	12.0	11.6	21.7	13.0	10.0	9.2	19.3	11.0
	MCS6 65.0Mbps DataRate	36.0	5180.0	12.0	11.5	22.0	13.0	10.0	9.8	20.2	12.0
		40.0	5200.0	12.0	11.3	21.7	13.0	10.0	10.0	20.2	12.0
		44.0	5220.0	12.0	11.7	21.9	13.0	10.0	9.2	19.5	11.0
		48.0	5240.0	12.0	11.5	21.4	13.0	10.0	10.0	20.2	12.0
	MCS7 72.2Mbps DataRate	36.0	5180.0	12.0	11.4	22.1	13.0	10.0	9.8	20.3	12.0
		40.0	5200.0	12.0	11.3	21.7	13.0	10.0	9.8	20.2	12.0
		44.0	5220.0	12.0	11.7	21.8	13.0	10.0	9.2	19.8	11.0
		48.0	5240.0	12.0	11.4	21.5	13.0	10.0	9.3	19.9	11.0
	MCS8 86.7Mbps DataRate	36.0	5180.0	12.0	11.9	22.7	14.0	10.0	9.2	20.2	12.0
		40.0	5200.0	12.0	11.6	22.4	14.0	10.0	9.3	20.1	12.0
		44.0	5220.0	12.0	12.0	22.6	14.0	10.0	9.8	20.3	12.0
		48.0	5240.0	12.0	11.8	22.2	14.0	10.0	9.7	20.5	12.0
5.2GHz 802.11ac / 40MHz BW	MCS0 15.0Mbps DataRate	38	5190	12.0	12.0	20.9	12.0	10.0	9.8	18.9	10.0
		46	5230	12.0	12.0	21.0	12.0	10.0	9.8	18.9	10.0
	MCS1 30.0Mbps DataRate	38	5190	12.0	11.8	21.0	12.0	10.0	9.5	19.0	10.0
		46	5230	12.0	11.7	20.9	12.0	10.0	9.6	19.0	10.0
	MCS2 45.0Mbps DataRate	38	5190	12.0	11.6	21.1	12.0	10.0	9.3	19.2	10.0
		46	5230	12.0	11.5	21.2	12.0	10.0	9.4	19.2	10.0
	MCS3 60.0Mbps DataRate	38	5190	12.0	12.0	21.6	13.0	10.0	10.0	19.8	11.0
		46	5230	12.0	12.0	21.7	13.0	10.0	9.9	19.6	11.0
	MCS4 90.0Mbps DataRate	38	5190	12.0	11.9	21.6	13.0	10.0	9.5	19.5	11.0
		46	5230	12.0	11.9	21.6	13.0	10.0	9.6	19.6	11.0
	MCS5 120.0Mbps DataRate	38	5190	12.0	11.6	21.7	13.0	10.0	9.2	19.8	11.0
		46	5230	12.0	11.6	21.6	13.0	10.0	9.2	19.3	11.0
	MCS6 135.0Mbps DataRate	38	5190	12.0	11.3	21.5	13.0	10.0	9.1	19.9	11.0
		46	5230	12.0	11.4	21.5	13.0	10.0	9.2	19.9	11.0
	MCS7 150.0Mbps DataRate	38	5190	12.0	11.3	21.6	13.0	10.0	9.2	19.9	11.0
		46	5230	12.0	11.3	21.4	13.0	10.0	9.2	19.9	11.0
	MCS8 180.0Mbps DataRate	38	5190	12.0	11.8	22.3	14.0	10.0	9.7	20.6	12.0
		46	5230	12.0	11.8	22.1	14.0	10.0	9.7	20.5	12.0
	MCS9 200.0Mbps DataRate	38	5190	12.0	11.7	22.2	14.0	10.0	9.7	20.5	12.0
		46	5230	12.0	11.6	22.2	14.0	10.0	9.6	20.5	12.0