

D2600V2, Serial No. 1061 Extended Dipole Calibrations

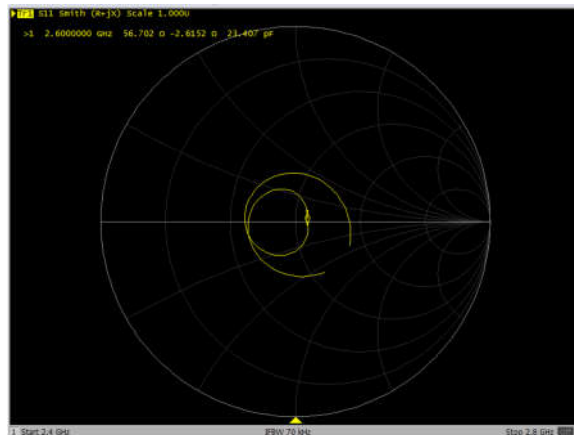
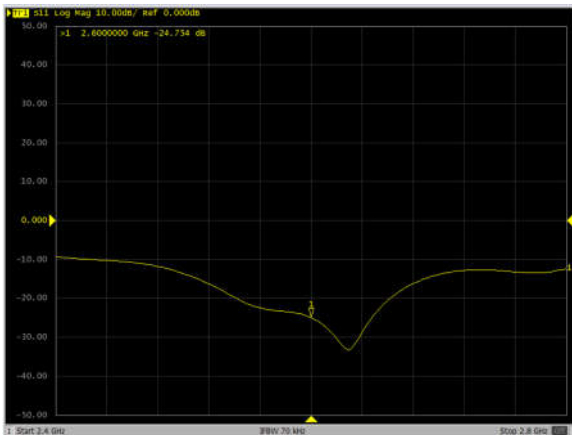
Referring to KDB 865664 D01, if dipoles are verified in return loss (<-20dB, within 20% of prior calibration), and in impedance (within 5 ohm of prior calibration), the annual calibration is not necessary and the calibration interval can be extended.

D2600V2 – serial no. 1061						
2600 Head						
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)
2020.11.26	-24.79		55.63		-2.31	
2021.11.25	-24.75	0.00	56.70	-1.07	-2.62	0.31

<Justification of the extended calibration>

The return loss is < -20dB, within 20% of prior calibration; the impedance is within 5 ohm of prior calibration. Therefore the verification result should support extended calibration.

Dipole Verification Data> D2600V2, serial no. 1061





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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Client **Sporton**

Certificate No: **D5GHzV2-1113_Sep19**

CALIBRATION CERTIFICATE

Object **D5GHzV2 - SN:1113**

Calibration procedure(s) **QA CAL-22.v4
Calibration Procedure for SAR Validation Sources between 3-6 GHz**

Calibration date: **September 24, 2019**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature $(22 \pm 3)^{\circ}\text{C}$ and humidity $< 70\%$.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	03-Apr-19 (No. 217-02892/02893)	Apr-20
Power sensor NRP-Z91	SN: 103244	03-Apr-19 (No. 217-02892)	Apr-20
Power sensor NRP-Z91	SN: 103245	03-Apr-19 (No. 217-02893)	Apr-20
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-19 (No. 217-02894)	Apr-20
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-19 (No. 217-02895)	Apr-20
Reference Probe EX3DV4	SN: 3503	25-Mar-19 (No. EX3-3503_Mar19)	Mar-20
DAE4	SN: 601	30-Apr-19 (No. DAE4-601_Apr19)	Apr-20

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Feb-19)	In house check: Oct-20
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-18)	In house check: Oct-20
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19

Calibrated by:	Name	Function	Signature
	Jeton Kastrati	Laboratory Technician	
Approved by:	Name	Function	Signature
	Katja Pokovic	Technical Manager	

Issued: September 25, 2019

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Accreditation No.: SCS 0108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:** The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- Feed Point Impedance and Return Loss:** These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- Electrical Delay:** One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured:** SAR measured at the stated antenna input power.
- SAR normalized:** SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:** The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4.0 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	5250 MHz ± 1 MHz 5600 MHz ± 1 MHz 5750 MHz ± 1 MHz	

Head TSL parameters at 5250 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.9	4.71 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.1 ± 6 %	4.53 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

SAR result with Head TSL at 5250 MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.09 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	80.5 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.33 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	23.1 W/kg ± 19.5 % (k=2)

Head TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.5	5.07 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.6 ± 6 %	4.88 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

SAR result with Head TSL at 5600 MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.40 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	83.4 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.40 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	23.8 W/kg ± 19.5 % (k=2)

Head TSL parameters at 5750 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.4	5.22 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.4 ± 6 %	5.03 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5750 MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.06 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	80.0 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.30 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	22.8 W/kg ± 19.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL at 5250 MHz

Impedance, transformed to feed point	51.7 Ω - 6.2 $j\Omega$
Return Loss	- 24.0 dB

Antenna Parameters with Head TSL at 5600 MHz

Impedance, transformed to feed point	56.0 Ω - 2.7 $j\Omega$
Return Loss	- 24.1 dB

Antenna Parameters with Head TSL at 5750 MHz

Impedance, transformed to feed point	56.7 Ω - 1.0 $j\Omega$
Return Loss	- 23.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.195 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
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Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1113

Communication System: UID 0 - CW; Frequency: 5250 MHz, Frequency: 5600 MHz,
Frequency: 5750 MHz

Medium parameters used: $f = 5250$ MHz; $\sigma = 4.53$ S/m; $\epsilon_r = 35.1$; $\rho = 1000$ kg/m³,

Medium parameters used: $f = 5600$ MHz; $\sigma = 4.88$ S/m; $\epsilon_r = 34.6$; $\rho = 1000$ kg/m³,

Medium parameters used: $f = 5750$ MHz; $\sigma = 5.03$ S/m; $\epsilon_r = 34.4$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.4, 5.4, 5.4) @ 5250 MHz, ConvF(4.95, 4.95, 4.95) @ 5600 MHz, ConvF(4.98, 4.98, 4.98) @ 5750 MHz; Calibrated: 25.03.2019
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2019
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.2(1504); SEMCAD X 14.6.12(7470)

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5250 MHz/Zoom Scan,

dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 78.54 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 27.9 W/kg

SAR(1 g) = 8.09 W/kg; SAR(10 g) = 2.33 W/kg

Maximum value of SAR (measured) = 18.1 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan,

dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 78.00 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 31.1 W/kg

SAR(1 g) = 8.40 W/kg; SAR(10 g) = 2.40 W/kg

Maximum value of SAR (measured) = 19.4 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5750 MHz/Zoom Scan,

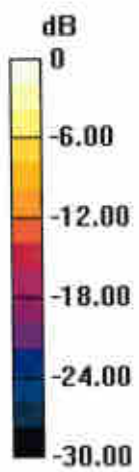
dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 75.13 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 31.8 W/kg

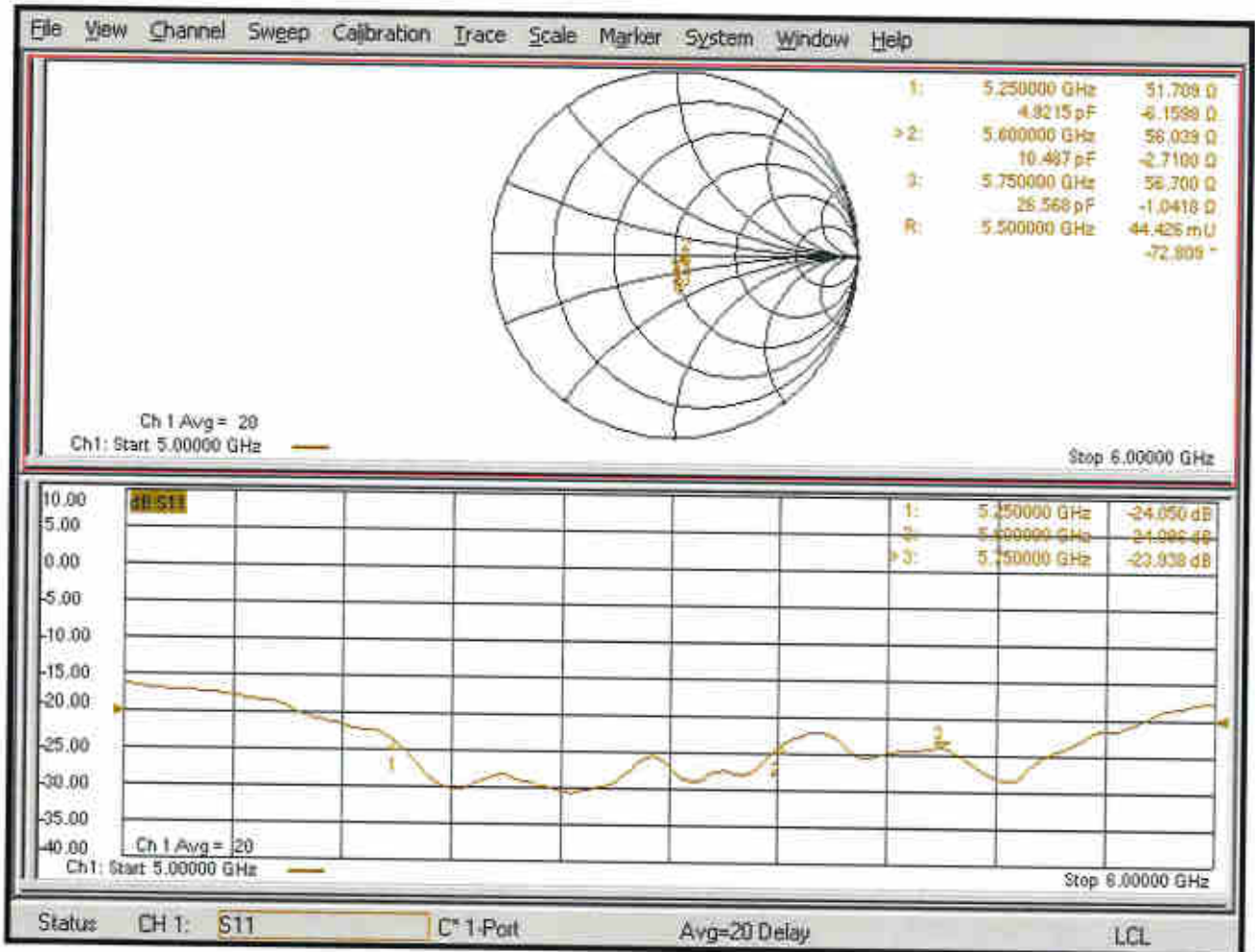
SAR(1 g) = 8.06 W/kg; SAR(10 g) = 2.30 W/kg

Maximum value of SAR (measured) = 19.0 W/kg



0 dB = 18.1 W/kg = 12.58 dBW/kg

Impedance Measurement Plot for Head TSL





D5GHzV2, Serial No. 1113 Extended Dipole Calibrations

Referring to KDB 865664 D01, if dipoles are verified in return loss (<-20dB, within 20% of prior calibration), and in impedance (within 5 ohm of prior calibration), the annual calibration is not necessary and the calibration interval can be extended.

D5GHzV2 – serial no. 1113						
5250 Head						
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)
2019.9.24	-24.05		51.71		-6.16	
2020.9.23	-24.80	-0.03	50.56	1.15	-5.94	-0.22
2021.9.23	-23.93	0.01	51.89	-0.18	-6.28	0.12

D5GHzV2 – serial no. 1113						
5600 Head						
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)
2019.9.24	-24.09		56.04		-2.71	
2020.9.23	-23.95	0.01	57.70	-1.66	-2.85	0.14
2021.9.23	-24.99	-0.04	56.04	0.01	-2.69	-0.02

D5GHzV2 – serial no. 1113						
5750 Head						
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)
2019.9.24	-23.94		56.70		-1.04	
2020.9.23	-21.92	0.08	58.56	-1.86	-1.58	0.54
2021.9.23	-22.90	0.04	57.64	-0.94	-1.04	0.00

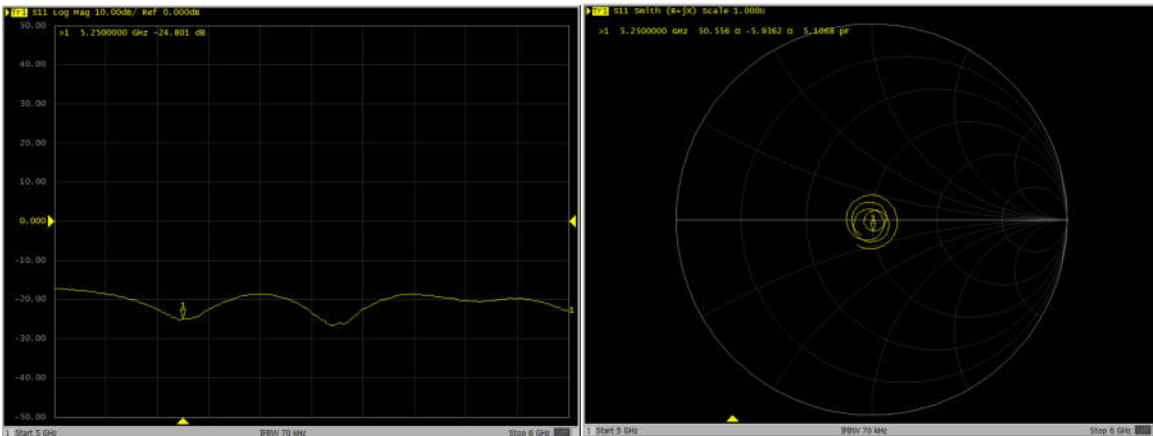


<Justification of the extended calibration>

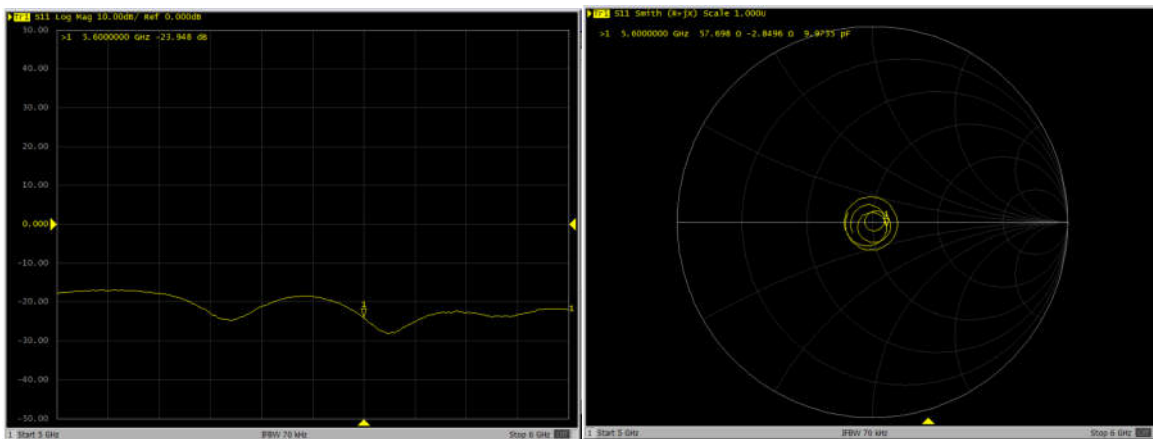
The return loss is < -20dB, within 20% of prior calibration; the impedance is within 5 ohm of prior calibration. Therefore the verification result should support extended calibration.

Dipole Verification Data> D5GHzV2, Serial No. 1113

5250MHz – Head—2020. 9. 23

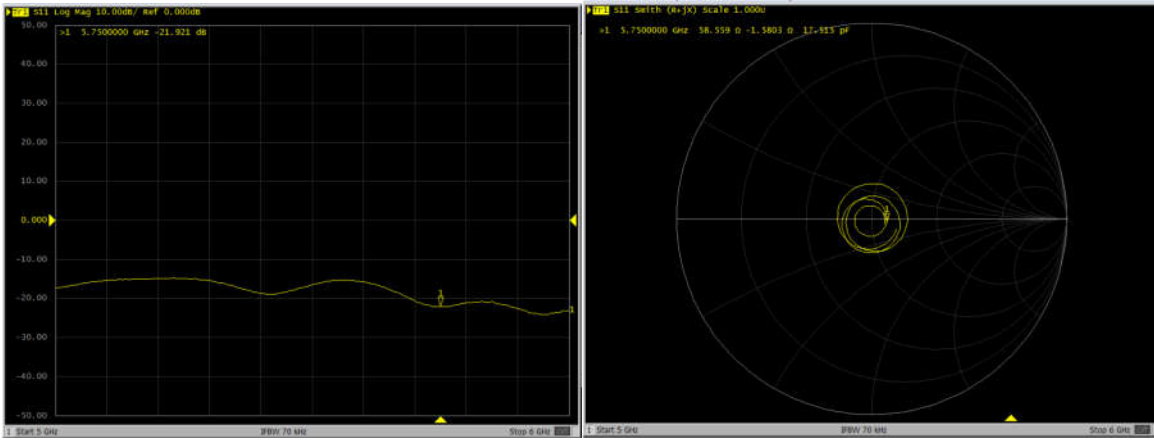


5600MHz – Head—2020. 9. 23

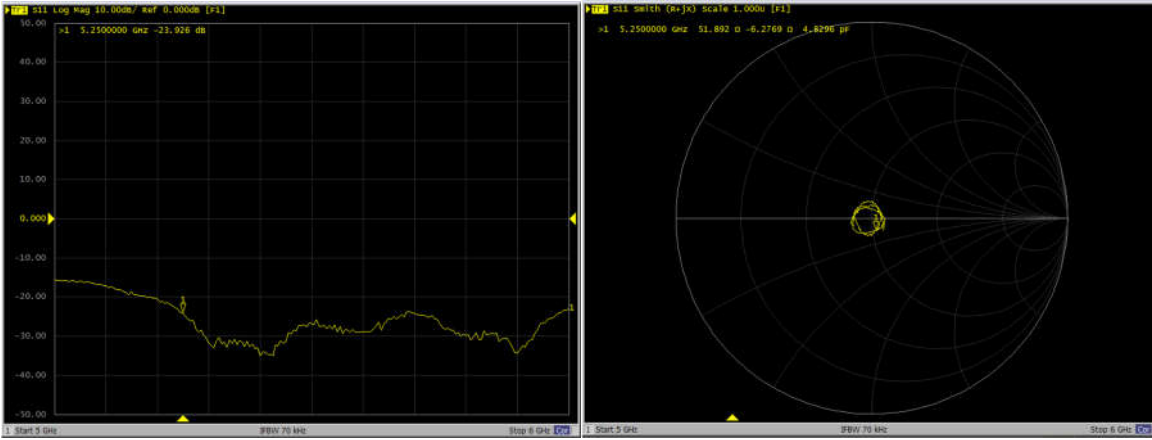




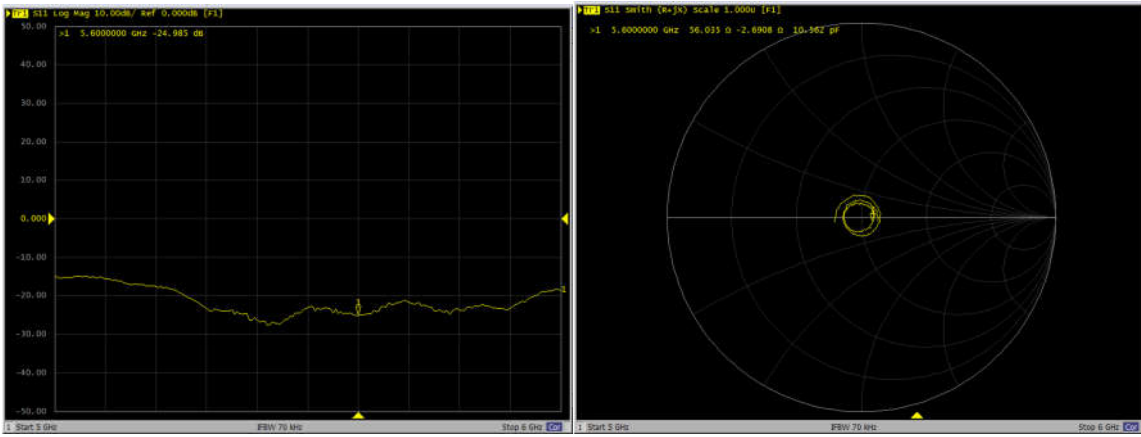
5750MHz – Head——2020. 9. 23



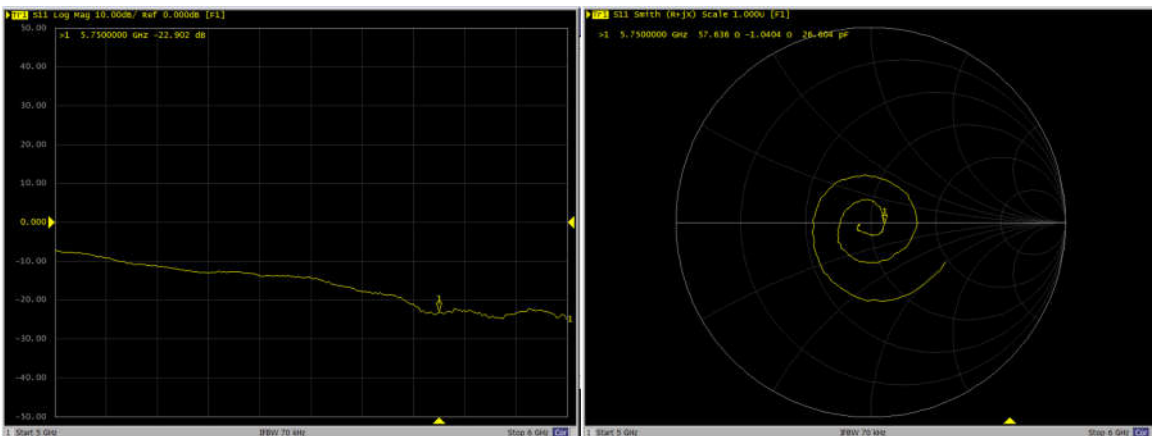
5250MHz – Head——2021. 9. 23



5600MHz – Head——2021. 9. 23



5750MHz – Head——2021. 9. 23



DAE4/1210
Spartan

IMPORTANT NOTICE

USAGE OF THE DAE4

The DAE unit is a delicate, high precision instrument and requires careful treatment by the user. There are no serviceable parts inside the DAE. Special attention shall be given to the following points:

Battery Exchange: The battery cover of the DAE4 unit is fixed using a screw, over tightening the screw may cause the threads inside the DAE to wear out.

Shipping of the DAE: Before shipping the DAE to SPEAG for calibration, remove the batteries and pack the DAE in an antistatic bag. This antistatic bag shall then be packed into a larger box or container which protects the DAE from impacts during transportation. The package shall be marked to indicate that a fragile instrument is inside.

E-Stop Failures: Touch detection may be malfunctioning due to broken magnets in the E-stop. Rough handling of the E-stop may lead to damage of these magnets. Touch and collision errors are often caused by dust and dirt accumulated in the E-stop. To prevent E-stop failure, the customer shall always mount the probe to the DAE carefully and keep the DAE unit in a non-dusty environment if not used for measurements.

Repair: Minor repairs are performed at no extra cost during the annual calibration. However, SPEAG reserves the right to charge for any repair especially if rough unprofessional handling caused the defect.

DASY Configuration Files: Since the exact values of the DAE input resistances, as measured during the calibration procedure of a DAE unit, are not used by the DASY software, a nominal value of 200 MOhm is given in the corresponding configuration file.

Important Note:

Warranty and calibration is void if the DAE unit is disassembled partly or fully by the Customer.

Important Note:

Never attempt to grease or oil the E-stop assembly. Cleaning and readjusting of the E-stop assembly is allowed by certified SPEAG personnel only and is part of the annual calibration procedure.

Important Note:

To prevent damage of the DAE probe connector pins, use great care when installing the probe to the DAE. Carefully connect the probe with the connector notch oriented in the mating position. Avoid any rotational movement of the probe body versus the DAE while turning the locking nut of the connector. The same care shall be used when disconnecting the probe from the DAE.



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Accreditation No.: **SCS 0108**

Client **Sporton**

Certificate No: **DAE4-1210_Aug21**

CALIBRATION CERTIFICATE

Object **DAE4 - SD 000 D04 BM - SN: 1210**

Calibration procedure(s) **QA CAL-06.v30
Calibration procedure for the data acquisition electronics (DAE)**

Calibration date: **August 25, 2021**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Keithley Multimeter Type 2001	SN: 0810278	07-Sep-20 (No:28647)	Sep-21
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Auto DAE Calibration Unit Calibrator Box V2.1	SE UWS 053 AA 1001	07-Jan-21 (in house check)	In house check: Jan-22
	SE UMS 006 AA 1002	07-Jan-21 (in house check)	In house check: Jan-22

Calibrated by:	Name	Function	Signature
	Eric Hainfeld	Laboratory Technician	
Approved by:	Name	Function	Signature
	Sven Kühn	Deputy Manager	

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Issued: August 25, 2021



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Accreditation No.: **SCS 0108**

Glossary

DAE data acquisition electronics
Connector angle information used in DASY system to align probe sensor X to the robot coordinate system.

Methods Applied and Interpretation of Parameters

- *DC Voltage Measurement:* Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- *Connector angle:* The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The following parameters as documented in the Appendix contain technical information as a result from the performance test and require no uncertainty.
 - *DC Voltage Measurement Linearity:* Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
 - *Common mode sensitivity:* Influence of a positive or negative common mode voltage on the differential measurement.
 - *Channel separation:* Influence of a voltage on the neighbor channels not subject to an input voltage.
 - *AD Converter Values with inputs shorted:* Values on the internal AD converter corresponding to zero input voltage
 - *Input Offset Measurement:* Output voltage and statistical results over a large number of zero voltage measurements.
 - *Input Offset Current:* Typical value for information; Maximum channel input offset current, not considering the input resistance.
 - *Input resistance:* Typical value for information: DAE input resistance at the connector, during internal auto-zeroing and during measurement.
 - *Low Battery Alarm Voltage:* Typical value for information. Below this voltage, a battery alarm signal is generated.
 - *Power consumption:* Typical value for information. Supply currents in various operating modes.

DC Voltage Measurement

A/D - Converter Resolution nominal

High Range: 1LSB = 6.1 μ V, full range = -100...+300 mV

Low Range: 1LSB = 61nV, full range = -1.....+3mV

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Calibration Factors	X	Y	Z
High Range	404.290 \pm 0.02% (k=2)	405.008 \pm 0.02% (k=2)	404.437 \pm 0.02% (k=2)
Low Range	3.98771 \pm 1.50% (k=2)	3.97281 \pm 1.50% (k=2)	3.98694 \pm 1.50% (k=2)

Connector Angle

Connector Angle to be used in DASY system	346.0 $^{\circ}$ \pm 1 $^{\circ}$
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Appendix (Additional assessments outside the scope of SCS0108)

1. DC Voltage Linearity

High Range	Reading (μV)	Difference (μV)	Error (%)
Channel X + Input	200031.74	-5.20	-0.00
Channel X + Input	20007.00	0.66	0.00
Channel X - Input	-20003.76	2.02	-0.01
Channel Y + Input	200032.53	-4.48	-0.00
Channel Y + Input	20002.34	-3.80	-0.02
Channel Y - Input	-20005.89	0.06	-0.00
Channel Z + Input	200035.33	-1.53	-0.00
Channel Z + Input	20005.56	-0.57	-0.00
Channel Z - Input	-20006.68	-0.66	0.00

Low Range	Reading (μV)	Difference (μV)	Error (%)
Channel X + Input	2001.67	0.15	0.01
Channel X + Input	202.46	0.87	0.43
Channel X - Input	-198.46	-0.15	0.08
Channel Y + Input	2001.38	-0.06	-0.00
Channel Y + Input	200.46	-0.99	-0.49
Channel Y - Input	-199.55	-1.09	0.55
Channel Z + Input	2002.38	0.97	0.05
Channel Z + Input	201.54	0.15	0.07
Channel Z - Input	-198.71	-0.09	0.05

2. Common mode sensitivity

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	23.70	22.30
	- 200	-22.08	-23.81
Channel Y	200	-10.37	-10.63
	- 200	8.74	8.55
Channel Z	200	-15.02	-15.51
	- 200	14.68	14.61

3. Channel separation

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	2.45	-3.47
Channel Y	200	8.17	-	4.38
Channel Z	200	9.64	5.92	-

4. AD-Converter Values with inputs shorted

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	High Range (LSB)	Low Range (LSB)
Channel X	15718	15716
Channel Y	16224	16348
Channel Z	15929	15908

5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Input 10M Ω

	Average (μ V)	min. Offset (μ V)	max. Offset (μ V)	Std. Deviation (μ V)
Channel X	0.71	-1.42	1.96	0.55
Channel Y	-1.29	-3.07	-0.19	0.42
Channel Z	0.27	-1.15	1.42	0.41

6. Input Offset Current

Nominal Input circuitry offset current on all channels: <25fA

7. Input Resistance (Typical values for information)

	Zeroing (kOhm)	Measuring (MOhm)
Channel X	200	200
Channel Y	200	200
Channel Z	200	200

8. Low Battery Alarm Voltage (Typical values for information)

Typical values	Alarm Level (VDC)
Supply (+ Vcc)	+7.9
Supply (- Vcc)	-7.6

9. Power Consumption (Typical values for information)

Typical values	Switched off (mA)	Stand by (mA)	Transmitting (mA)
Supply (+ Vcc)	+0.01	+6	+14
Supply (- Vcc)	-0.01	-8	-9



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Client **Auden**

Certificate No: **Z21-60210**

CALIBRATION CERTIFICATE

Object **EX3DV4 - SN : 3975**

Calibration Procedure(s) **FF-Z11-004-02**
Calibration Procedures for Dosimetric E-field Probes

Calibration date: **June 07, 2021**

This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements(SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature(22±3)°C and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	101919	16-Jun-20(CTTL, No.J20X04344)	Jun-21
Power sensor NRP-Z91	101547	16-Jun-20(CTTL, No.J20X04344)	Jun-21
Power sensor NRP-Z91	101548	16-Jun-20(CTTL, No.J20X04344)	Jun-21
Reference 10dBAttenuator	18N50W-10dB	10-Feb-20(CTTL, No.J20X00525)	Feb-22
Reference 20dBAttenuator	18N50W-20dB	10-Feb-20(CTTL, No.J20X00526)	Feb-22
Reference Probe EX3DV4	SN 3617	27-Jan-21(SPEAG, No.EX3-3617_Jan21)	Jan-22
DAE4	SN 1556	15-Jan-21(SPEAG, No.DAE4-1556_Jan21)	Jan-22

Secondary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
SignalGenerator MG3700A	6201052605	23-Jun-20(CTTL, No.J20X04343)	Jun-21
Network Analyzer E5071C	MY46110673	21-Jan-21(CTTL, No.J20X00515)	Jan-22

	Name	Function	Signature
Calibrated by:	Yu Zongying	SAR Test Engineer	
Reviewed by:	Lin Hao	SAR Test Engineer	
Approved by:	Qi Dianyuan	SAR Project Leader	

Issued: June 09, 2021

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.



Glossary:

TSL	tissue simulating liquid
NORM _{x,y,z}	sensitivity in free space
ConvF	sensitivity in TSL / NORM _{x,y,z}
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A,B,C,D	modulation dependent linearization parameters
Polarization Φ	Φ rotation around probe axis
Polarization θ	θ rotation around an axis that is in the plane normal to probe axis (at measurement center), $\theta=0$ is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Methods Applied and Interpretation of Parameters:

- NORM_{x,y,z}**: Assessed for E-field polarization $\theta=0$ ($f \leq 900\text{MHz}$ in TEM-cell; $f > 1800\text{MHz}$: waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not effect the E^2 -field uncertainty inside TSL (see below ConvF).
- NORM(f)_{x,y,z}** = NORM_{x,y,z} * frequency_response (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- DCP_{x,y,z}**: DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency nor media.
- PAR**: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics.
- A_{x,y,z}; B_{x,y,z}; C_{x,y,z}; VR_{x,y,z}**: A,B,C are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- ConvF and Boundary Effect Parameters**: Assessed in flat phantom using E-field (or Temperature Transfer Standard for $f \leq 800\text{MHz}$) and inside waveguide using analytical field distributions based on power measurements for $f > 800\text{MHz}$. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty valued are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORM_{x,y,z}* ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from $\pm 50\text{MHz}$ to $\pm 100\text{MHz}$.
- Spherical isotropy (3D deviation from isotropy)**: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset**: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- Connector Angle**: The angle is assessed using the information gained by determining the NORM_x (no uncertainty required).



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DASY/EASY – Parameters of Probe: EX3DV4 – SN:3975

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm($\mu\text{V}/(\text{V}/\text{m})^2$) ^A	0.41	0.45	0.51	$\pm 10.0\%$
DCP(mV) ^B	105.1	102.2	102.1	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB $\sqrt{\mu\text{V}}$	C	D dB	VR mV	Unc ^E (k=2)
0	CW	X	0.0	0.0	1.0	0.00	163.0	$\pm 2.6\%$
		Y	0.0	0.0	1.0		171.0	
		Z	0.0	0.0	1.0		183.8	

The reported uncertainty of measurement is stated as the standard uncertainty of Measurement multiplied by the coverage factor $k=2$, which for a normal distribution Corresponds to a coverage probability of approximately 95%.

^A The uncertainties of Norm X, Y, Z do not affect the E²-field uncertainty inside TSL (see Page 4).

^B Numerical linearization parameter: uncertainty not required.

^E Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.



DASY/EASY – Parameters of Probe: EX3DV4 – SN:3975

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz] ^C	Relative Permittivity ^F	Conductivity (S/m) ^F	ConvF X	ConvF Y	ConvF Z	Alpha ^G	Depth ^G (mm)	Unct. (k=2)
750	41.9	0.89	10.04	10.04	10.04	0.40	0.75	±12.1%
835	41.5	0.90	9.54	9.54	9.54	0.17	1.18	±12.1%
900	41.5	0.97	9.52	9.52	9.52	0.17	1.14	±12.1%
1450	40.5	1.20	8.59	8.59	8.59	0.12	1.28	±12.1%
1750	40.1	1.37	8.38	8.38	8.38	0.28	0.92	±12.1%
1900	40.0	1.40	7.92	7.92	7.92	0.21	1.15	±12.1%
2000	40.0	1.40	7.97	7.97	7.97	0.19	1.21	±12.1%
2300	39.5	1.67	7.84	7.84	7.84	0.65	0.67	±12.1%
2450	39.2	1.80	7.60	7.60	7.60	0.67	0.67	±12.1%
2600	39.0	1.96	7.35	7.35	7.35	0.65	0.67	±12.1%
3300	38.2	2.71	6.88	6.88	6.88	0.44	0.96	±13.3%
3500	37.9	2.91	6.82	6.82	6.82	0.42	0.95	±13.3%
3700	37.7	3.12	6.52	6.52	6.52	0.44	1.03	±13.3%
3900	37.5	3.32	6.40	6.40	6.40	0.40	1.25	±13.3%
4100	37.2	3.53	6.50	6.50	6.50	0.40	1.15	±13.3%
4200	37.1	3.63	6.32	6.32	6.32	0.40	1.25	±13.3%
4400	36.9	3.84	6.19	6.19	6.19	0.35	1.35	±13.3%
4600	36.7	4.04	6.10	6.10	6.10	0.45	1.20	±13.3%
4800	36.4	4.25	6.05	6.05	6.05	0.45	1.20	±13.3%
4950	36.3	4.40	5.86	5.86	5.86	0.45	1.26	±13.3%
5250	35.9	4.71	5.31	5.31	5.31	0.40	1.55	±13.3%
5600	35.5	5.07	4.82	4.82	4.82	0.50	1.30	±13.3%
5750	35.4	5.22	4.90	4.90	4.90	0.50	1.30	±13.3%

^C Frequency validity above 300 MHz of ±100MHz only applies for DASY v4.4 and higher (Page 2), else it is restricted to ±50MHz. The uncertainty is the RSS of ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

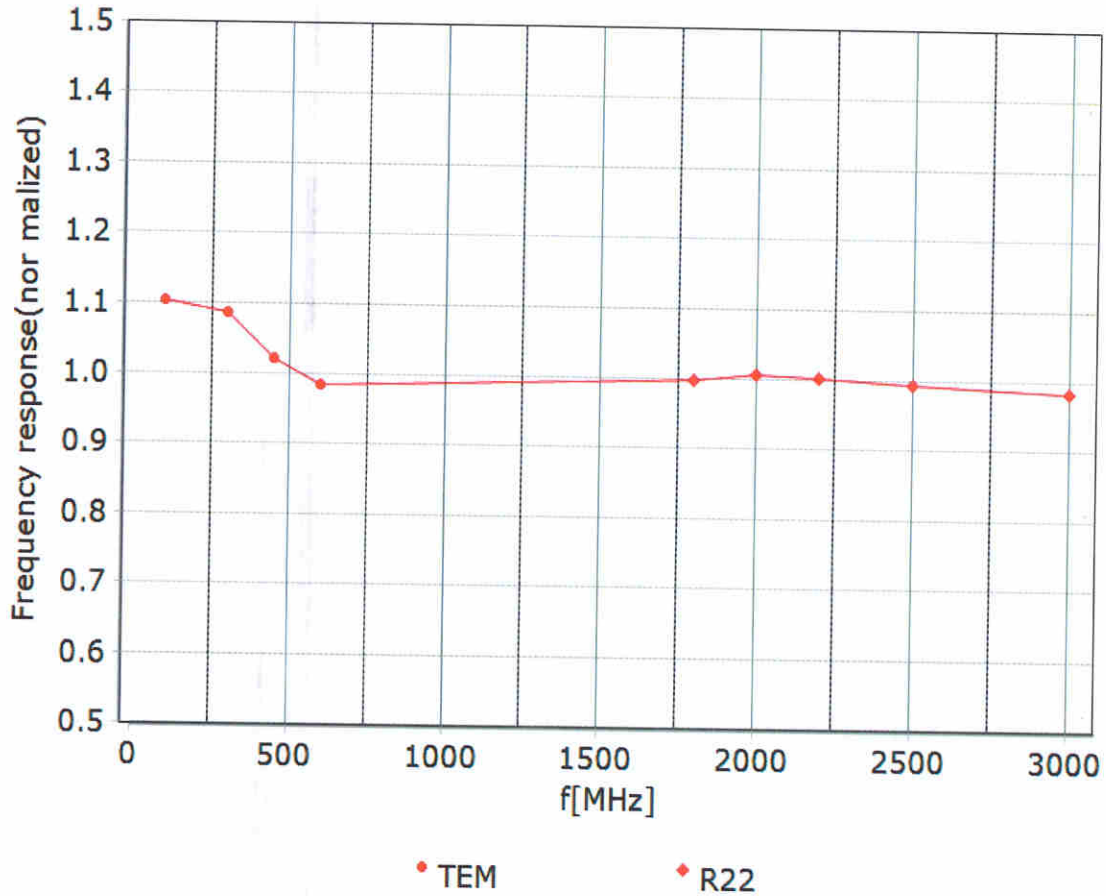
^F At frequency below 3 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ϵ and σ) is restricted to ±5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

^G Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for the frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.



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Frequency Response of E-Field (TEM-Cell: ifi110 EXX, Waveguide: R22)



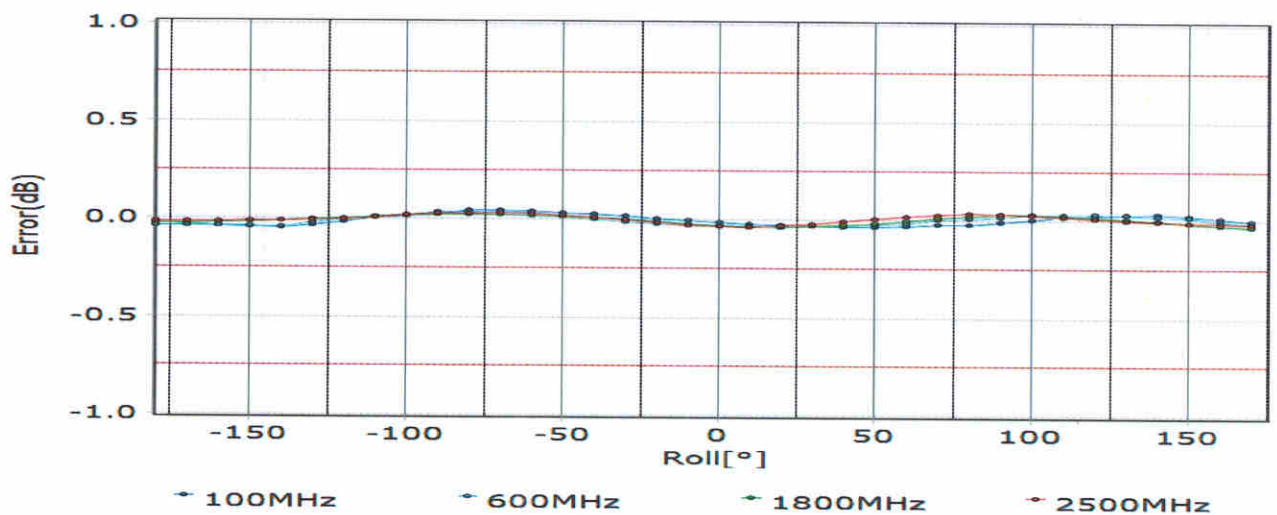
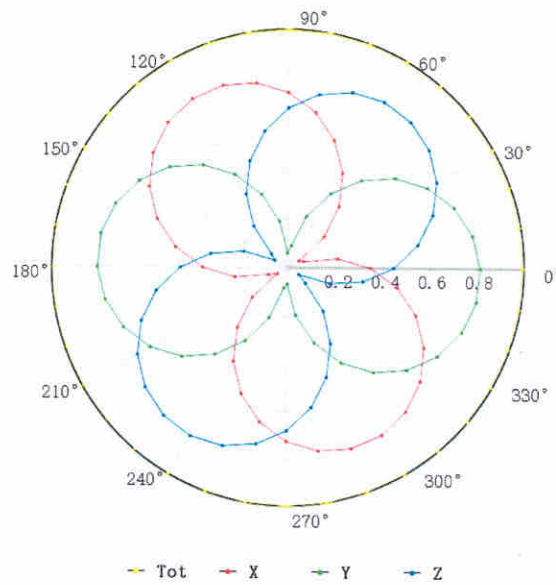
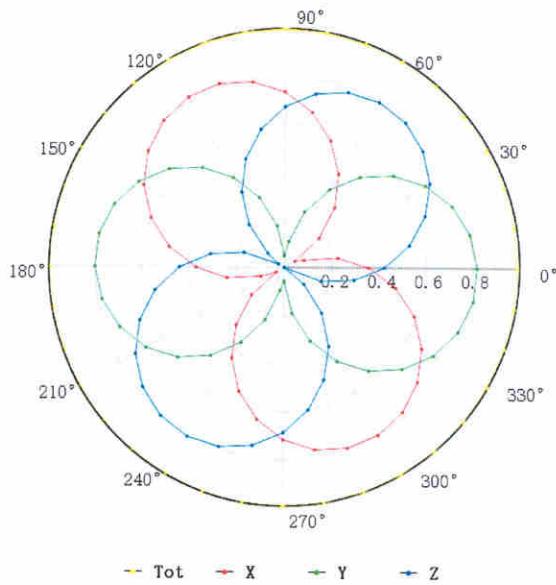
Uncertainty of Frequency Response of E-field: $\pm 7.4\%$ ($k=2$)



Receiving Pattern (Φ), $\theta=0^\circ$

f=600 MHz, TEM

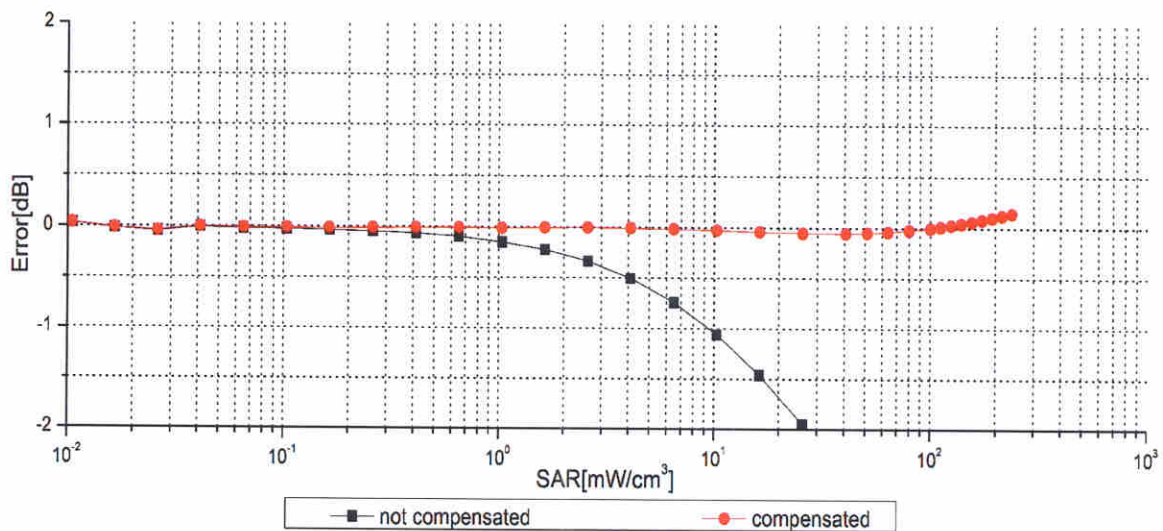
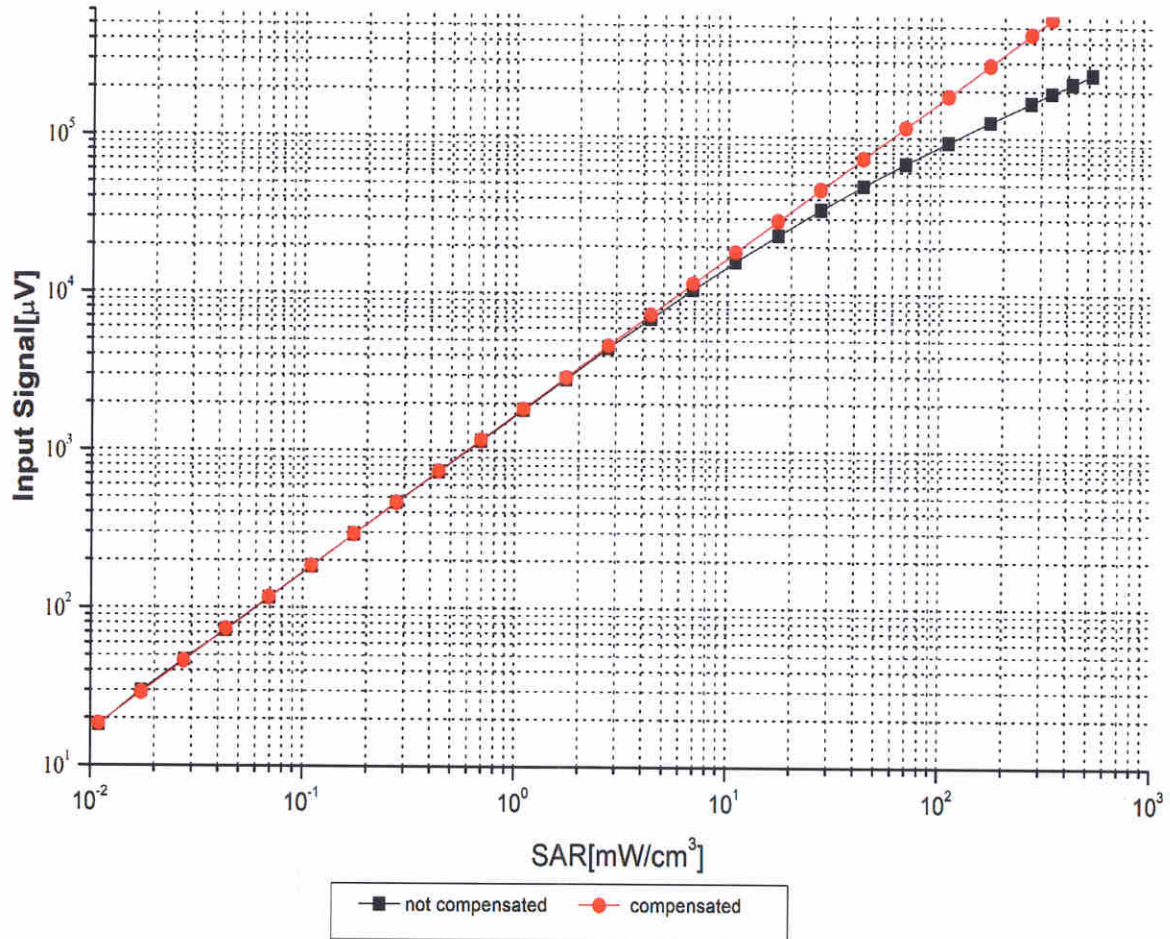
f=1800 MHz, R22



Uncertainty of Axial Isotropy Assessment: $\pm 1.2\%$ ($k=2$)



Dynamic Range f(SAR_{head}) (TEM cell, f = 900 MHz)



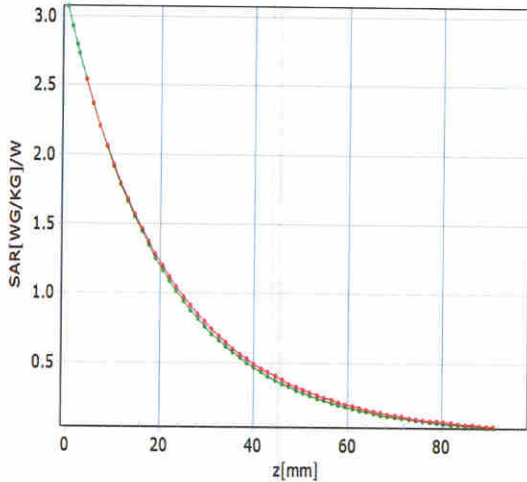
Uncertainty of Linearity Assessment: ±0.9% (k=2)



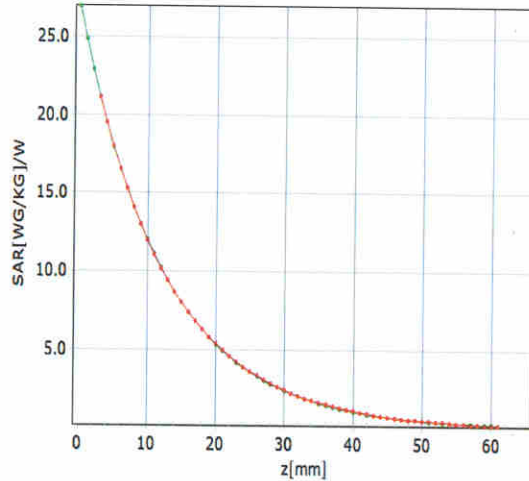
Conversion Factor Assessment

f=750 MHz,WGLS R9(H_convF)

f=1750 MHz,WGLS R22(H_convF)

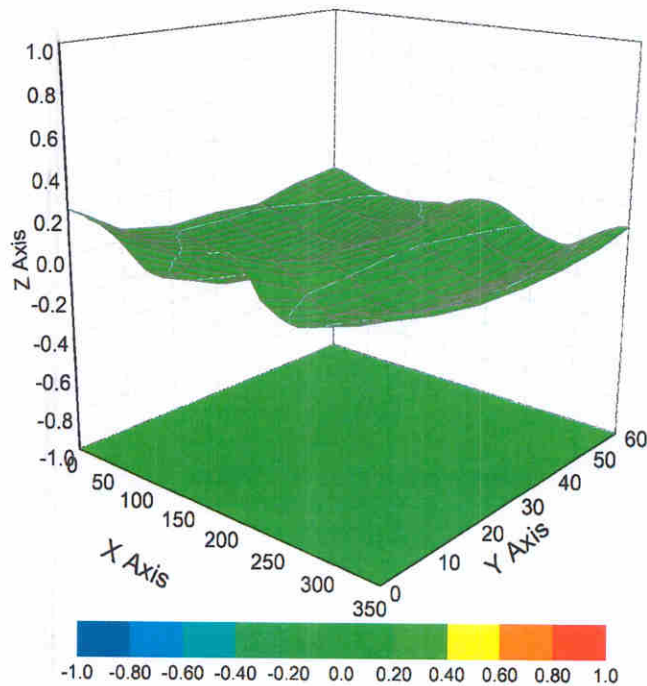


+ analytical + measured



+ analytical + measured

Deviation from Isotropy in Liquid



Uncertainty of Spherical Isotropy Assessment: $\pm 3.2\%$ ($k=2$)



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DASY/EASY – Parameters of Probe: EX3DV4 – SN:3975

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	86.5
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disable
Probe Overall Length	337mm
Probe Body Diameter	10mm
Tip Length	9mm
Tip Diameter	2.5mm
Probe Tip to Sensor X Calibration Point	1mm
Probe Tip to Sensor Y Calibration Point	1mm
Probe Tip to Sensor Z Calibration Point	1mm
Recommended Measurement Distance from Surface	1.4mm



Appendix E. Conducted RF Output Power Table

The detailed power table are shown as follows.



Full Power Mode

GSM850 Tx Channel	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	128	189	251		128	189	251	
Frequency (MHz)	824.2	836.4	848.8		824.2	836.4	848.8	
GSM 1 Tx slot	32.55	32.56	32.61	33.50	23.55	23.56	23.61	24.50
GPRS 1 Tx slot	32.53	32.51	32.54	33.50	23.53	23.51	23.54	24.50
GPRS 2 Tx slots	30.93	30.92	30.96	32.00	24.93	24.92	24.96	26.00
GPRS 3 Tx slots	29.64	29.67	29.65	30.00	25.38	25.41	25.39	25.74
GPRS 4 Tx slots	27.61	27.61	27.63	28.00	24.61	24.61	24.63	25.00
EDGE 1 Tx slot	26.76	26.73	26.83	28.00	17.76	17.73	17.83	19.00
EDGE 2 Tx slots	25.67	25.68	25.72	26.50	19.67	19.68	19.72	20.50
EDGE 3 Tx slots	23.12	23.11	23.26	24.50	18.86	18.85	19.00	20.24
EDGE 4 Tx slots	21.85	21.72	21.75	22.50	18.85	18.72	18.75	19.50

GSM1900 Tx Channel	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	512	661	810		512	661	810	
Frequency (MHz)	1850.2	1880	1909.6		1850.2	1880	1909.6	
GSM 1 Tx slot	29.37	29.48	29.43	30.50	20.37	20.48	20.43	21.50
GPRS 1 Tx slot	29.37	29.50	29.45	30.50	20.37	20.50	20.45	21.50
GPRS 2 Tx slots	27.63	27.94	27.91	29.50	21.83	21.94	21.91	23.50
GPRS 3 Tx slots	26.87	27.00	26.97	27.50	22.61	22.74	22.71	23.24
GPRS 4 Tx slots	24.06	24.98	24.92	25.50	21.86	21.98	21.92	22.50
EDGE 1 Tx slots	25.76	25.80	25.81	27.00	16.76	16.80	16.81	18.00
EDGE 2 Tx slots	24.73	24.75	24.65	26.00	18.73	18.75	18.65	20.00
EDGE 3 Tx slots	22.59	22.73	22.78	24.00	18.33	18.47	18.52	19.74
EDGE 4 Tx slots	21.64	21.74	21.60	23.00	18.64	18.74	18.60	20.00

Band Tx Channel	WCDMA II			Tune-up Limit (dBm)	WCDMA IV			Tune-up Limit (dBm)	WCDMA V			Tune-up Limit (dBm)
	9262	9400	9538		1312	1413	1513		4132	4182	4233	
Rx Channel	9662	9800	9938		1637	1638	1738		4367	4407	4458	
Frequency (MHz)	1852.4	1880	1907.6		1712.4	1732.6	1752.6		826.4	836.4	846.6	
3GPP Rel 99 AMR 12.2Kbps	22.74	22.76	22.65	24.00	22.94	22.95	22.86	24.00	22.67	22.75	22.71	24.00
3GPP Rel 99 RMC 12.2Kbps	22.74	22.90	22.63	24.00	22.91	23.02	22.86	24.00	22.72	22.82	22.67	24.00
3GPP Rel 6 HSDPA Subtest-1	21.71	21.71	21.54	23.00	21.93	21.90	21.86	23.00	21.77	21.82	21.74	23.00
3GPP Rel 6 HSDPA Subtest-2	21.60	21.58	21.49	23.00	21.89	21.90	21.81	23.00	21.73	21.76	21.67	23.00
3GPP Rel 6 HSDPA Subtest-3	21.08	21.10	20.96	22.50	21.38	21.42	21.31	22.50	21.32	21.21	21.17	22.50
3GPP Rel 6 HSDPA Subtest-4	21.07	21.14	20.97	22.50	21.33	21.34	21.31	22.50	21.27	21.20	21.11	22.50
3GPP Rel 6 DC-HSDPA Subtest-1	21.76	21.78	21.72	23.00	21.92	21.99	21.92	23.00	21.75	21.79	21.77	23.00
3GPP Rel 6 DC-HSDPA Subtest-2	21.58	21.65	21.60	23.00	21.90	21.93	21.85	23.00	21.73	21.75	21.75	23.00
3GPP Rel 6 DC-HSDPA Subtest-3	21.11	21.15	21.13	22.50	21.42	21.45	21.38	22.50	21.35	21.38	21.36	22.50
3GPP Rel 6 DC-HSDPA Subtest-4	21.09	21.11	21.10	22.50	21.37	21.40	21.33	22.50	21.33	21.35	21.32	22.50
3GPP Rel 6 HSUPA Subtest-1	20.99	20.54	20.55	22.50	20.50	20.56	20.62	22.50	20.55	20.58	20.55	22.50
3GPP Rel 6 HSUPA Subtest-2	20.16	20.32	20.24	20.50	20.28	20.36	20.38	20.50	20.26	20.24	20.35	20.50
3GPP Rel 6 HSUPA Subtest-3	21.14	21.25	21.21	21.50	21.25	21.31	21.39	21.50	21.23	21.25	21.30	21.50
3GPP Rel 6 HSUPA Subtest-4	19.29	19.74	19.71	20.50	19.80	19.82	19.87	20.50	19.72	19.75	19.74	20.50
3GPP Rel 6 HSUPA Subtest-5	21.40	21.20	21.10	22.50	21.20	21.30	21.30	22.50	21.30	21.30	21.20	22.50



Band 38									
BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)	
Channel				37850	38000	38150			
Frequency (MHz)				2580	2595	2610			
20	QPSK	1	0	22.63	22.93	22.87	24	0	
20	QPSK	1	49	23.11	23.26	23.20			
20	QPSK	1	99	22.71	22.77	22.71			
20	QPSK	50	0	21.98	22.20	22.13	23	1	
20	QPSK	50	24	21.97	22.13	22.03			
20	QPSK	50	50	22.00	22.13	22.10			
20	QPSK	100	0	22.00	22.16	22.10	23	1	
20	16QAM	1	0	21.72	22.00	21.98			
20	16QAM	1	49	22.19	22.43	22.24			
20	16QAM	1	99	21.74	21.87	21.77	22	2	
20	16QAM	50	0	21.10	21.15	21.19			
20	16QAM	50	24	21.05	21.24	21.14			
20	16QAM	50	50	21.03	21.22	21.07	22	2	
20	16QAM	100	0	21.06	21.16	21.12			
20	64QAM	1	0	20.56	20.72	20.66			
20	64QAM	1	49	20.93	21.07	21.00	22	2	
20	64QAM	1	99	20.51	20.59	20.50			
20	64QAM	50	0	20.08	20.24	20.20			
20	64QAM	50	24	20.06	20.19	20.17	21	3	
20	64QAM	50	50	20.07	20.22	20.15			
20	64QAM	100	0	20.10	20.20	20.12			
Channel				37825	38000	38175	Tune-up limit (dBm)	MPR (dB)	
Frequency (MHz)				2577.5	2595	2612.5			
15	QPSK	1	0	22.62	22.74	22.88	24	0	
15	QPSK	1	37	22.91	22.99	23.14			
15	QPSK	1	74	22.75	22.86	22.96			
15	QPSK	36	0	21.72	21.87	21.99	23	1	
15	QPSK	36	20	21.84	22.02	22.04			
15	QPSK	36	39	21.82	21.99	22.06			
15	QPSK	75	0	21.78	21.90	22.04	23	1	
15	16QAM	1	0	21.69	21.79	21.89			
15	16QAM	1	37	21.99	22.10	22.19			
15	16QAM	1	74	21.77	21.89	22.07	22	2	
15	16QAM	36	0	20.63	20.81	20.91			
15	16QAM	36	20	20.80	20.86	20.94			
15	16QAM	36	39	20.79	20.93	20.99	22	2	
15	16QAM	75	0	20.79	20.97	21.00			
15	64QAM	1	0	20.47	20.57	20.61			
15	64QAM	1	37	20.71	20.83	20.93	22	2	
15	64QAM	1	74	20.48	20.63	20.76			
15	64QAM	36	0	19.71	19.93	20.02			
15	64QAM	36	20	19.80	19.89	20.03	21	3	
15	64QAM	36	39	19.84	20.00	20.04			
15	64QAM	75	0	19.79	19.99	20.05			
Channel				37800	38000	38200	Tune-up limit (dBm)	MPR (dB)	
Frequency (MHz)				2575	2595	2615			
10	QPSK	1	0	22.72	22.87	23.01	24	0	
10	QPSK	1	25	22.68	22.82	22.99			
10	QPSK	1	49	22.76	22.93	23.08			
10	QPSK	25	0	21.75	21.91	22.04	23	1	
10	QPSK	25	12	21.78	22.00	22.09			
10	QPSK	25	25	21.85	21.97	22.10			
10	QPSK	50	0	21.77	21.97	22.05	23	1	
10	16QAM	1	0	21.83	21.91	22.06			
10	16QAM	1	25	21.75	21.87	22.07			
10	16QAM	1	49	21.83	22.02	22.18	22	2	
10	16QAM	25	0	20.79	20.95	21.09			
10	16QAM	25	12	20.82	20.97	21.15			
10	16QAM	25	25	20.90	20.98	21.14	22	2	
10	16QAM	50	0	20.84	21.00	21.14			
10	64QAM	1	0	20.56	20.66	20.76			
10	64QAM	1	25	20.47	20.69	20.85	22	2	
10	64QAM	1	49	20.63	20.78	20.91			
10	64QAM	25	0	19.85	19.99	20.16			
10	64QAM	25	12	19.93	20.07	20.18	21	3	
10	64QAM	25	25	19.95	20.03	20.26			
10	64QAM	50	0	19.83	20.05	20.12			
Channel				37775	38000	38225	Tune-up limit (dBm)	MPR (dB)	
Frequency (MHz)				2572.5	2595	2617.5			
5	QPSK	1	0	22.57	22.71	22.94	24	0	
5	QPSK	1	12	22.81	23.04	23.24			
5	QPSK	1	24	22.59	22.79	22.92			
5	QPSK	12	0	21.75	21.88	22.11	23	1	
5	QPSK	12	7	21.78	21.91	22.14			
5	QPSK	12	13	21.75	21.97	22.12			
5	QPSK	25	0	21.71	21.95	22.11	23	1	
5	16QAM	1	0	21.67	21.85	22.02			
5	16QAM	1	12	21.96	22.09	22.22			
5	16QAM	1	24	21.70	21.88	22.06	22	2	
5	16QAM	12	0	20.64	20.83	21.07			
5	16QAM	12	7	20.76	20.94	21.10			
5	16QAM	12	13	20.76	20.85	21.10	22	2	
5	16QAM	25	0	20.80	20.93	21.12			
5	64QAM	1	0	20.40	20.61	20.82			
5	64QAM	1	12	20.67	20.85	21.04	22	2	
5	64QAM	1	24	20.48	20.61	20.82			
5	64QAM	12	0	19.76	19.94	20.10			
5	64QAM	12	7	19.78	19.95	20.18	21	3	
5	64QAM	12	13	19.79	19.92	20.11			
5	64QAM	25	0	19.79	20.04	20.23			



Reduced Power Mode for Hotspot On

GSM850 TX Channel	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	128	189	251		128	189	251	
Frequency (MHz)	824.2	836.4	848.8		824.2	836.4	848.8	
GSM 1 Tx slot	30.60	30.58	30.65	31.50	21.80	21.58	21.65	22.50
GPRS 1 Tx slot	30.62	30.64	30.68	31.50	21.62	21.64	21.68	22.50
GPRS 2 Tx slots	28.88	28.86	28.95	30.00	22.88	22.86	22.95	24.00
GPRS 3 Tx slots	27.73	27.72	27.80	28.00	23.47	23.46	23.54	23.74
GPRS 4 Tx slots	25.71	25.73	25.80	26.00	22.71	22.73	22.80	23.00
EDGE 1 Tx slot	24.96	24.93	25.03	26.00	15.96	15.93	16.03	17.00
EDGE 2 Tx slots	23.87	23.88	23.92	24.50	17.87	17.88	17.92	18.50
EDGE 3 Tx slots	21.32	21.31	21.46	22.50	17.06	17.05	17.20	18.24
EDGE 4 Tx slots	20.05	19.92	19.95	20.50	17.05	16.92	16.95	17.50

GSM1900 TX Channel	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	512	661	810		512	661	810	
Frequency (MHz)	1850.2	1880	1909.8		1850.2	1880	1909.8	
GSM 1 Tx slot	23.75	23.92	24.02	25.00	14.75	14.92	15.02	16.00
GPRS 1 Tx slot	23.80	23.95	24.04	25.00	14.80	14.95	15.04	16.00
GPRS 2 Tx slots	22.33	22.61	22.54	24.00	16.33	16.61	16.54	18.00
GPRS 3 Tx slots	21.31	21.47	21.61	22.00	17.05	17.21	17.35	17.74
GPRS 4 Tx slots	19.24	19.47	19.67	20.00	16.24	16.47	16.67	17.00
EDGE 1 Tx slot	20.23	20.31	20.20	21.50	11.23	11.31	11.20	12.50
EDGE 2 Tx slots	19.22	19.28	18.92	20.50	13.22	13.28	12.92	14.50
EDGE 3 Tx slots	17.21	17.30	16.95	18.50	12.95	13.04	12.69	14.24
EDGE 4 Tx slots	16.02	15.95	15.72	17.50	13.02	12.95	12.72	14.50

Band TX Channel	Rx Channel	WCDMA II			Tune-up Limit (dBm)	WCDMA IV			Tune-up Limit (dBm)	WCDMA V			Tune-up Limit (dBm)
		9262	9400	9538		1312	1413	1513		4132	4182	4233	
Frequency (MHz)	9662	9800	9938		1537	1638	1738		4357	4407	4458		
	1852.4	1880	1907.6		1712.4	1732.6	1752.6		826.4	836.4	846.6		
3GPP Rel 99	AMR 12.2Kbps	15.78	15.76	15.59	17.00	15.40	15.61	15.63	16.50	21.87	21.95	21.99	23.00
3GPP Rel 99	RM 12.2Kbps	15.79	15.80	15.61	17.00	15.44	15.65	15.64	16.50	21.89	22.01	22.00	23.00
3GPP Rel 6	HSDPA Subtest-1	14.78	14.85	14.61	16.00	14.49	14.60	14.74	15.50	20.87	20.97	20.95	22.00
3GPP Rel 6	HSDPA Subtest-2	14.69	14.61	14.51	16.00	14.40	14.56	14.62	15.50	20.84	20.93	20.87	22.00
3GPP Rel 6	HSDPA Subtest-3	14.20	14.08	13.97	15.50	13.93	14.07	14.14	15.00	20.37	20.39	20.39	21.50
3GPP Rel 6	HSDPA Subtest-4	14.15	14.08	14.05	15.50	13.89	14.03	14.12	15.00	20.25	20.37	20.42	21.50
3GPP Rel 6	DC-HSDPA Subtest-1	14.57	14.37	14.34	16.00	14.22	14.43	14.43	15.50	20.77	20.80	20.84	22.00
3GPP Rel 6	DC-HSDPA Subtest-2	14.41	14.28	14.21	16.00	14.12	14.31	14.35	15.50	20.78	20.77	20.75	22.00
3GPP Rel 6	DC-HSDPA Subtest-3	13.99	13.62	13.78	15.50	13.72	13.78	13.85	15.00	20.37	20.26	20.25	21.50
3GPP Rel 6	DC-HSDPA Subtest-4	13.86	13.79	13.76	15.50	13.69	13.86	13.83	15.00	20.34	20.26	20.20	21.50
3GPP Rel 6	HSUPA Subtest-1	13.55	13.33	13.31	15.50	13.06	13.27	13.20	15.00	19.70	19.61	19.50	21.50
3GPP Rel 6	HSUPA Subtest-2	13.15	13.00	12.88	13.50	12.66	12.79	12.63	13.00	19.44	19.36	19.21	19.50
3GPP Rel 6	HSUPA Subtest-3	14.11	13.98	13.99	14.50	13.81	13.70	13.59	14.00	20.38	20.29	20.34	20.50
3GPP Rel 6	HSUPA Subtest-4	12.79	12.66	12.65	13.50	12.65	12.77	12.61	13.00	19.20	19.05	19.06	19.50
3GPP Rel 6	HSUPA Subtest-5	14.30	14.20	14.20	15.50	14.30	14.10	14.10	15.00	20.40	20.50	20.30	21.50



Band 38									
BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)	
Channel				37850	38000	38150			
Frequency (MHz)				2580	2595	2610			
20	QPSK	1	0	14.93	14.83	14.84	16	0	
20	QPSK	1	49	15.03	15.06	14.96			
20	QPSK	1	99	14.82	14.61	14.68			
20	QPSK	50	0	13.92	14.02	13.98	15	1	
20	QPSK	50	24	13.84	13.69	13.73			
20	QPSK	50	50	13.77	13.70	13.70			
20	QPSK	100	0	13.70	13.71	13.59	15	1	
20	16QAM	1	0	13.67	13.54	13.62			
20	16QAM	1	49	13.66	13.53	13.55			
20	16QAM	1	99	13.64	13.45	13.51	14	2	
20	16QAM	50	0	13.19	13.20	13.21			
20	16QAM	50	24	13.20	12.99	13.06			
20	16QAM	50	50	12.77	12.76	12.74	14	2	
20	16QAM	100	0	12.69	12.53	12.58			
20	64QAM	1	0	12.69	12.65	12.64			
20	64QAM	1	49	12.66	12.53	12.53	14	2	
20	64QAM	1	99	12.47	12.25	12.31			
20	64QAM	50	0	12.20	12.11	12.19			
20	64QAM	50	24	11.96	11.80	11.87	13	3	
20	64QAM	50	50	11.73	11.73	11.71			
20	64QAM	100	0	11.68	11.43	11.53			
Channel				37825	38000	38175	Tune-up limit (dBm)	MPR (dB)	
Frequency (MHz)				2577.5	2595	2612.5			
15	QPSK	1	0	14.62	14.41	14.50	16	0	
15	QPSK	1	37	14.63	14.42	14.55			
15	QPSK	1	74	14.61	14.38	14.49			
15	QPSK	36	0	14.19	14.08	14.10	15	1	
15	QPSK	36	20	14.14	13.90	14.00			
15	QPSK	36	39	13.72	13.49	13.57			
15	QPSK	75	0	13.77	13.51	13.57	15	1	
15	16QAM	1	0	13.69	13.50	13.59			
15	16QAM	1	37	13.70	13.47	13.58			
15	16QAM	1	74	13.82	13.57	13.71	14	2	
15	16QAM	36	0	13.47	13.26	13.29			
15	16QAM	36	20	13.32	13.15	13.25			
15	16QAM	36	39	12.64	12.41	12.49	14	2	
15	16QAM	75	0	12.64	12.50	12.52			
15	64QAM	1	0	12.65	12.46	12.53			
15	64QAM	1	37	12.69	12.48	12.58	14	2	
15	64QAM	1	74	12.67	12.43	12.51			
15	64QAM	36	0	12.34	12.12	12.14			
15	64QAM	36	20	12.18	11.92	12.05	13	3	
15	64QAM	36	39	11.64	11.41	11.54			
15	64QAM	75	0	11.66	11.51	11.54			
Channel				37800	38000	38200	Tune-up limit (dBm)	MPR (dB)	
Frequency (MHz)				2575	2595	2615			
10	QPSK	1	0	14.60	14.49	14.67	16	0	
10	QPSK	1	25	14.64	14.50	14.63			
10	QPSK	1	49	14.68	14.43	14.50			
10	QPSK	25	0	14.12	13.99	14.12	15	1	
10	QPSK	25	12	14.11	13.90	14.04			
10	QPSK	25	25	13.77	13.50	13.63			
10	QPSK	50	0	13.77	13.55	13.69	15	1	
10	16QAM	1	0	13.79	13.55	13.69			
10	16QAM	1	25	13.78	13.59	13.64			
10	16QAM	1	49	14.02	13.73	13.82	14	2	
10	16QAM	25	0	13.45	13.27	13.45			
10	16QAM	25	12	13.47	13.20	13.36			
10	16QAM	25	25	12.81	12.54	12.65	14	2	
10	16QAM	50	0	12.79	12.59	12.68			
10	64QAM	1	0	12.77	12.59	12.70			
10	64QAM	1	25	12.75	12.57	12.63	14	2	
10	64QAM	1	49	12.81	12.54	12.66			
10	64QAM	25	0	12.41	12.14	12.24			
10	64QAM	25	12	12.24	12.02	12.15	13	3	
10	64QAM	25	25	11.80	11.57	11.61			
10	64QAM	50	0	11.79	11.62	11.66			
Channel				37775	38000	38225	Tune-up limit (dBm)	MPR (dB)	
Frequency (MHz)				2572.5	2595	2617.5			
5	QPSK	1	0	14.68	14.40	14.57	16	0	
5	QPSK	1	12	14.61	14.40	14.60			
5	QPSK	1	24	14.57	14.25	14.45			
5	QPSK	12	0	14.11	13.93	14.12	15	1	
5	QPSK	12	7	14.06	13.77	13.98			
5	QPSK	12	13	13.77	13.45	13.65			
5	QPSK	25	0	13.72	13.52	13.69	15	1	
5	16QAM	1	0	13.75	13.50	13.65			
5	16QAM	1	12	13.71	13.47	13.64			
5	16QAM	1	24	13.86	13.57	13.76	14	2	
5	16QAM	12	0	13.44	13.22	13.40			
5	16QAM	12	7	13.36	13.09	13.27			
5	16QAM	12	13	12.73	12.73	12.65	14	2	
5	16QAM	25	0	12.83	12.70	12.69			
5	64QAM	1	0	12.72	12.52	12.64			
5	64QAM	1	12	12.78	12.50	12.65	14	2	
5	64QAM	1	24	12.71	12.45	12.61			
5	64QAM	12	0	12.33	12.08	12.20			
5	64QAM	12	7	12.16	11.94	12.09	13	3	
5	64QAM	12	13	11.74	11.69	11.71			
5	64QAM	25	0	11.75	11.48	11.70			



Reduced Power Mode for P-Sensor On

GSM850 TX Channel	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	128	189	251		128	189	251	
Frequency (MHz)	824.2	836.4	848.6		824.2	836.4	848.6	
GSM 1 Tx slot	30.60	30.58	30.65	31.50	21.60	21.58	21.65	22.50
GPRS 1 Tx slot	30.82	30.64	30.88	31.50	21.62	21.64	21.88	22.50
GPRS 2 Tx slots	28.88	28.86	28.95	30.00	22.88	22.86	22.95	24.00
GPRS 3 Tx slots	27.73	27.72	27.80	28.00	23.47	23.46	23.54	23.74
GPRS 4 Tx slots	25.71	25.73	25.80	26.00	22.71	22.73	22.80	23.00
EDGE 1 Tx slot	24.96	24.93	25.03	26.00	15.96	15.93	16.03	17.00
EDGE 2 Tx slots	23.87	23.88	23.92	24.50	17.87	17.88	17.92	18.50
EDGE 3 Tx slots	21.32	21.31	21.46	22.50	17.06	17.05	17.20	18.24
EDGE 4 Tx slots	20.05	19.92	19.95	20.50	17.05	16.92	16.95	17.50

GSM1900 TX Channel	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	512	661	810		512	661	810	
Frequency (MHz)	1850.2	1880	1909.6		1850.2	1880	1909.6	
GSM 1 Tx slot	25.72	25.85	25.90	26.50	16.72	16.85	16.90	17.50
GPRS 1 Tx slot	25.73	25.86	25.93	26.50	16.73	16.86	16.93	17.50
GPRS 2 Tx slots	23.85	24.08	23.99	25.50	17.85	18.08	17.99	19.50
GPRS 3 Tx slots	22.87	23.01	23.15	23.50	18.61	18.75	18.89	19.24
GPRS 4 Tx slots	20.81	20.98	21.16	21.50	17.81	17.98	18.16	18.50
EDGE 1 Tx slot	21.82	21.65	21.64	23.00	12.82	12.65	12.64	14.00
EDGE 2 Tx slots	20.75	20.63	20.52	22.00	14.75	14.63	14.52	16.00
EDGE 3 Tx slots	18.77	18.33	18.39	20.00	14.51	14.07	14.13	15.74
EDGE 4 Tx slots	17.52	17.29	17.12	19.00	14.52	14.29	14.12	16.00

Band TX Channel	WCDMA II			Tune-up Limit (dBm)	WCDMA IV			Tune-up Limit (dBm)	WCDMA V			Tune-up Limit (dBm)	
	9262	9400	9538		1312	1413	1513		4132	4182	4233		
Rx Channel	9662	9800	9938		1537	1638	1738		4357	4407	4458		
Frequency (MHz)	1852.4	1880	1907.6		1712.4	1732.6	1752.6		826.4	836.4	846.6		
3GPP Rel 99	AMR 12.2Kbps	17.25	17.34	17.12	18.50	16.52	16.58	16.54	17.50	21.87	21.95	21.99	23.00
3GPP Rel 99	RMC 12.2Kbps	17.30	17.38	17.20	18.50	16.53	16.62	16.58	17.50	21.88	22.01	22.00	23.00
3GPP Rel 6	HSDPA Subtest-1	16.31	16.38	16.20	17.50	15.43	15.66	15.66	16.00	20.87	20.97	20.95	22.00
3GPP Rel 6	HSDPA Subtest-2	16.18	16.20	16.09	17.50	15.44	15.49	15.64	16.00	20.84	20.93	20.87	22.00
3GPP Rel 6	HSDPA Subtest-3	15.70	15.74	15.56	17.00	14.92	14.96	15.12	15.50	20.37	20.39	20.39	21.50
3GPP Rel 6	HSDPA Subtest-4	15.63	15.65	15.53	17.00	14.90	15.01	15.06	15.50	20.25	20.37	20.42	21.50
3GPP Rel 6	DC-HSDPA Subtest-1	16.02	15.89	15.77	17.50	15.15	15.33	15.39	16.00	20.77	20.80	20.84	22.00
3GPP Rel 6	DC-HSDPA Subtest-2	15.98	15.91	15.67	17.50	15.14	15.29	15.34	16.00	20.78	20.77	20.75	22.00
3GPP Rel 6	DC-HSDPA Subtest-3	15.43	15.35	15.20	17.00	14.61	14.77	14.80	15.50	20.37	20.26	20.25	21.50
3GPP Rel 6	DC-HSDPA Subtest-4	15.40	15.30	15.17	17.00	14.64	14.80	14.82	15.50	20.34	20.26	20.20	21.50
3GPP Rel 6	HSUPA Subtest-1	15.01	15.06	15.05	17.00	14.03	14.12	14.02	16.00	19.70	19.61	19.59	21.50
3GPP Rel 6	HSUPA Subtest-2	14.57	14.63	14.47	15.00	13.51	13.54	13.42	14.00	19.44	19.36	19.21	19.50
3GPP Rel 6	HSUPA Subtest-3	15.58	15.71	15.65	16.00	14.54	14.48	14.48	15.00	20.38	20.29	20.34	20.50
3GPP Rel 6	HSUPA Subtest-4	14.48	14.41	14.29	15.00	13.56	13.59	13.45	14.00	19.20	19.05	19.06	19.50
3GPP Rel 6	HSUPA Subtest-5	15.90	15.80	15.70	17.00	15.20	15.20	15.10	16.00	20.40	20.50	20.30	21.50



Band 2									
BW (MHz)	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)	
Channel									
Frequency (MHz)				1870	1880	1910			
20	QPSK	1	0	16.56	16.88	16.84	18.5	0	
20	QPSK	1	49	17.04	17.10	17.08			
20	QPSK	1	99	16.56	16.53	16.65			
20	QPSK	50	0	16.05	16.07	16.02			
20	QPSK	50	24	15.99	16.00	15.96	17.5	1	
20	QPSK	50	50	15.93	15.89	15.92			
20	QPSK	100	0	15.99	16.04	15.96			
20	16QAM	1	0	16.13	16.02	16.23	17.5	1	
20	16QAM	1	49	16.30	16.23	16.32			
20	16QAM	1	99	16.09	15.85	15.83			
20	16QAM	50	0	15.00	15.07	15.22			
20	16QAM	50	24	15.04	15.07	15.12	18.5	2	
20	16QAM	50	50	14.92	14.98	14.99			
20	16QAM	100	0	14.99	15.13	15.13			
20	84QAM	1	0	14.68	15.09	14.87			
20	84QAM	1	49	15.46	14.87	15.43	16.5	2	
20	84QAM	1	99	14.70	14.36	15.03			
20	84QAM	50	0	14.16	14.27	14.12			
20	84QAM	50	24	14.04	14.07	13.93			
20	84QAM	50	50	14.00	14.10	13.99	15.5	3	
20	84QAM	100	0	14.01	14.11	13.98			
Channel									
Frequency (MHz)				1875	1890	1915			
15	QPSK	1	0	17.02	16.91	16.85	18.5	0	
15	QPSK	1	37	17.09	17.07	17.09			
15	QPSK	1	74	16.88	16.65	16.82			
15	QPSK	35	0	16.06	16.11	16.00	17.5	1	
15	QPSK	35	20	16.09	16.10	15.95			
15	QPSK	35	39	16.03	15.88	15.98			
15	QPSK	75	0	16.06	15.98	15.97			
15	16QAM	1	0	16.25	15.93	15.79	17.5	1	
15	16QAM	1	37	16.67	16.24	16.74			
15	16QAM	1	74	15.91	15.83	16.43			
15	16QAM	35	0	15.11	15.19	15.01	18.5	2	
15	16QAM	35	20	15.08	15.11	15.09			
15	16QAM	35	39	14.95	14.99	15.00			
15	16QAM	75	0	15.00	15.03	15.08			
15	84QAM	1	0	15.39	15.21	15.29	16.5	2	
15	84QAM	1	37	15.58	15.38	15.36			
15	84QAM	1	74	15.19	15.11	15.20			
15	84QAM	35	0	14.12	14.01	14.09	15.5	3	
15	84QAM	35	20	14.02	13.98	14.02			
15	84QAM	35	39	13.97	13.91	13.96			
15	84QAM	75	0	14.10	13.95	13.96			
Channel									
Frequency (MHz)				1885	1890	1915			
10	QPSK	1	0	17.08	16.89	16.79	18.5	0	
10	QPSK	1	25	17.04	17.08	16.92			
10	QPSK	1	49	16.84	16.82	16.89			
10	QPSK	25	0	16.15	16.06	15.91	17.5	1	
10	QPSK	25	12	16.04	16.01	15.99			
10	QPSK	25	25	16.13	16.00	15.96			
10	QPSK	50	0	16.13	16.00	15.92	17.5	1	
10	16QAM	1	0	16.32	16.60	15.86			
10	16QAM	1	25	16.33	16.61	16.21	17.5	1	
10	16QAM	1	49	16.13	16.15	16.06			
10	16QAM	25	0	15.05	15.00	15.08	18.5	2	
10	16QAM	25	12	15.06	15.05	15.08			
10	16QAM	25	25	15.05	14.99	14.95			
10	16QAM	50	0	15.17	15.01	15.00	16.5	2	
10	84QAM	1	0	15.42	15.15	15.04	18.5	2	
10	84QAM	1	25	15.42	15.02	15.44			
10	84QAM	1	49	15.23	14.91	15.18			
10	84QAM	25	0	14.01	14.21	14.00	15.5	3	
10	84QAM	25	12	14.05	14.08	14.08			
10	84QAM	25	25	14.06	14.03	13.90			
10	84QAM	50	0	14.05	13.97	14.01			
Channel									
Frequency (MHz)				1885	1890	1915			
5	QPSK	1	0	16.89	16.74	16.69	18.5	0	
5	QPSK	1	12	16.92	16.77	17.08			
5	QPSK	1	24	16.92	16.84	16.80			
5	QPSK	12	0	16.13	16.04	15.89	17.5	1	
5	QPSK	12	7	16.11	15.93	15.91			
5	QPSK	12	13	16.05	15.94	15.93			
5	QPSK	25	0	16.07	16.01	16.01	17.5	1	
5	16QAM	1	0	16.33	16.49	16.06			
5	16QAM	1	12	16.46	16.49	16.42	17.5	1	
5	16QAM	1	24	16.57	16.07	16.42			
5	16QAM	12	0	15.02	15.02	15.07	16.5	2	
5	16QAM	12	7	14.98	15.14	15.07			
5	16QAM	12	13	15.04	14.97	14.95			
5	16QAM	25	0	15.08	15.15	15.01	16.5	2	
5	84QAM	1	0	14.89	14.84	14.97			
5	84QAM	1	12	15.74	15.57	14.76	16.5	2	
5	84QAM	1	24	15.25	14.87	15.13			
5	84QAM	12	0	13.88	14.04	14.01	15.5	3	
5	84QAM	12	7	14.09	14.07	14.12			
5	84QAM	12	13	14.17	14.04	13.96			
5	84QAM	25	0	14.10	14.04	14.02			
Channel									
Frequency (MHz)				1885	1890	1915			
3	QPSK	1	0	16.85	16.88	16.99	18.5	0	
3	QPSK	1	8	17.01	16.85	16.83			
3	QPSK	1	14	16.84	17.01	16.96			
3	QPSK	8	0	16.05	15.95	15.94	17.5	1	
3	QPSK	8	4	16.16	16.08	16.01			
3	QPSK	8	7	16.05	15.99	15.94			
3	QPSK	15	0	16.08	15.96	15.96	17.5	1	
3	16QAM	1	0	16.04	16.55	16.44			
3	16QAM	1	8	16.29	16.15	16.27	17.5	1	
3	16QAM	1	14	16.58	15.95	16.16			
3	16QAM	8	0	15.15	15.08	15.08	16.5	2	
3	16QAM	8	4	15.12	15.16	15.18			
3	16QAM	8	7	15.02	15.09	15.07			
3	16QAM	15	0	15.32	15.10	15.27	16.5	2	
3	84QAM	1	8	15.06	15.04	15.05			
3	84QAM	1	14	15.28	15.20	14.99			
3	84QAM	8	0	14.05	14.25	13.99	15.5	3	
3	84QAM	8	4	14.13	14.01	14.03			
3	84QAM	8	7	14.10	13.90	14.03			
3	84QAM	15	0	14.18	13.91	14.06			
Channel									
Frequency (MHz)				1897	1900	1913			
1.4	QPSK	1	0	16.93	16.99	16.85	18.5	0	
1.4	QPSK	1	3	17.06	16.98	16.94			
1.4	QPSK	1	5	17.04	16.77	16.82			
1.4	QPSK	3	0	17.03	16.98	16.99	17.5	1	
1.4	QPSK	3	1	16.86	16.93	16.98			
1.4	QPSK	3	3	17.04	17.09	16.93			
1.4	QPSK	6	0	16.16	15.96	15.97	16.5	1	
1.4	16QAM	1	0	16.63	15.84	16.17			
1.4	16QAM	1	5	16.39	15.05	14.91	17.5	1	
1.4	16QAM	1	3	16.65	16.55	16.49			
1.4	16QAM	3	0	16.26	16.07	16.12			
1.4	16QAM	3	1	16.35	16.02	16.07	16.5	2	
1.4	16QAM	3	3	16.17	16.00	15.91			
1.4	16QAM	6	0	15.20	15.06	15.20	15.5	2	
1.4	84QAM	1	0	15.15	15.05	14.98			
1.4	84QAM	1	3	15.48	15.27	15.46	16.5	2	
1.4	84QAM	1	5	15.39	15.05	14.91			
1.4	84QAM	3	0	15.34	15.09	15.23			
1.4	84QAM	3	1	15.14	15.47	15.02			
1.4	84QAM	3	3	15.20	15.12	15.20	15.5	3	
1.4	84QAM	6	0	14.06	14.07	13.98			

Band 4									
BW (MHz)	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)	
Channel									
Frequency (MHz)				20650	20175	20300			
20	QPSK	1	0	17.20	17.23	17.43	17.5	0	
20	QPSK	1	49	16.51	16.66	16.62			
20	QPSK	1							



Band 7									
BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)	
Channel									
Frequency (MHz)									
20	QPSK	1	0	2510	2535	2550			
20	QPSK	1	49	13.46	13.74	13.73	15	0	
20	QPSK	1	99	13.14	13.39	13.35			
20	QPSK	50	0	12.73	12.76	12.75			
20	QPSK	50	24	12.60	12.75	12.73	14	1	
20	QPSK	50	50	12.49	12.74	12.73			
20	QPSK	100	0	12.53	12.75	12.74			
20	16QAM	1	0	12.36	12.47	12.52			
20	16QAM	1	49	12.54	13.30	13.23	14	1	
20	16QAM	1	99	12.66	12.54	12.84			
20	16QAM	50	0	11.51	11.59	11.74			
20	16QAM	50	24	11.53	11.61	11.74			
20	16QAM	50	50	11.63	11.66	11.69	13	2	
20	16QAM	100	0	11.50	11.67	11.62			
20	64QAM	1	0	11.31	11.54	11.61			
20	64QAM	1	49	11.35	11.81	11.83	13	2	
20	64QAM	1	99	11.01	11.45	11.83			
20	64QAM	50	0	10.45	10.59	10.74			
20	64QAM	50	24	10.46	10.61	10.74	12	3	
20	64QAM	50	50	10.52	10.77	10.70			
20	64QAM	100	0	10.58	10.55	10.73			
Channel									
Frequency (MHz)									
15	QPSK	1	0	13.27	13.44	13.35			
15	QPSK	1	37	13.53	13.68	13.66	15	0	
15	QPSK	1	74	13.29	13.61	13.63			
15	QPSK	36	0	12.43	12.57	12.69			
15	QPSK	36	20	12.46	12.77	12.71	14	1	
15	QPSK	36	39	12.43	12.67	12.79			
15	QPSK	75	0	12.40	12.71	12.72			
15	16QAM	1	0	12.88	12.77	12.68			
15	16QAM	1	37	13.03	13.19	12.92	14	1	
15	16QAM	1	74	12.55	12.89	12.60			
15	16QAM	36	0	11.33	11.57	11.60			
15	16QAM	36	20	11.45	11.69	11.69			
15	16QAM	36	39	11.42	11.61	11.63	13	2	
15	16QAM	75	0	11.47	11.69	11.67			
15	64QAM	1	0	11.58	11.75	11.80			
15	64QAM	1	37	11.82	11.67	12.08	13	2	
15	64QAM	1	74	11.42	11.58	12.00			
15	64QAM	36	0	10.34	10.61	10.55			
15	64QAM	36	20	10.35	10.56	10.74	12	3	
15	64QAM	36	39	10.44	10.70	10.67			
15	64QAM	75	0	10.49	10.66	10.68			
Channel									
Frequency (MHz)									
10	QPSK	1	0	13.29	13.45	13.55			
10	QPSK	1	25	13.41	13.52	13.65	15	0	
10	QPSK	1	49	13.40	13.66	13.51			
10	QPSK	25	0	12.41	12.69	12.68			
10	QPSK	25	12	12.40	12.66	12.72	14	1	
10	QPSK	25	25	12.37	12.70	12.73			
10	QPSK	50	0	12.44	12.68	12.65			
10	16QAM	1	0	12.54	12.76	12.61	14	1	
10	16QAM	1	25	12.94	13.14	13.28			
10	16QAM	1	49	12.63	12.70	12.84			
10	16QAM	25	0	11.32	11.64	11.80			
10	16QAM	25	12	11.37	11.59	11.72	13	2	
10	16QAM	25	25	11.49	11.76	11.77			
10	16QAM	50	0	11.39	11.68	11.67			
10	64QAM	1	0	11.41	11.58	11.42	13	2	
10	64QAM	1	25	11.34	11.67	11.76			
10	64QAM	1	49	11.63	11.40	11.46			
10	64QAM	25	0	10.36	10.55	10.62			
10	64QAM	25	12	10.36	10.53	10.70	12	3	
10	64QAM	25	25	10.26	10.65	10.74			
10	64QAM	50	0	10.30	10.50	10.61			
Channel									
Frequency (MHz)									
5	QPSK	1	0	13.16	13.46	13.43			
5	QPSK	1	12	13.34	13.68	13.64	15	0	
5	QPSK	1	24	13.06	13.53	13.44			
5	QPSK	12	0	12.32	12.67	12.66			
5	QPSK	12	7	12.31	12.65	12.74	14	1	
5	QPSK	12	13	12.34	12.66	12.68			
5	QPSK	25	0	12.30	12.63	12.60			
5	16QAM	1	0	12.72	12.70	12.69			
5	16QAM	1	12	12.68	12.78	13.32	14	1	
5	16QAM	1	24	12.33	12.97	12.63			
5	16QAM	12	0	11.31	11.61	11.66			
5	16QAM	12	7	11.38	11.60	11.74	13	2	
5	16QAM	12	13	11.24	11.51	11.70			
5	16QAM	25	0	11.20	11.57	11.77			
5	64QAM	1	0	11.22	11.73	11.52			
5	64QAM	1	12	11.55	11.60	11.63	13	2	
5	64QAM	1	24	11.01	11.55	11.64			
5	64QAM	12	0	10.25	10.57	10.76			
5	64QAM	12	7	10.27	10.62	10.60	12	3	
5	64QAM	12	13	10.24	10.58	10.57			
5	64QAM	25	0	10.25	10.60	10.72			

Band 13									
BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)	
Channel									
Frequency (MHz)									
10	QPSK	1	0	23.29					
10	QPSK	1	25	23.10			24	0	
10	QPSK	1	49	22.94					
10	QPSK	25	0	21.98					
10	QPSK	25	12	21.97			23	1	
10	QPSK	25	25	21.91					
10	QPSK	50	0	21.95					
10	16QAM	1	0	22.24					
10	16QAM	1	25	22.32			23	1	
10	16QAM	1	49	22.28					
10	16QAM	25	0	20.93					
10	16QAM	25	12	21.01					
10	16QAM	25	25	20.92			22	2	
10	16QAM	50	0	20.97					
10	64QAM	1	0	21.18					
10	64QAM	1	25	21.27			22	2	
10	64QAM	1	49	21.18					
10	64QAM	25	0	19.93					
10	64QAM	25	12	20.00			21	3	
10	64QAM	25	25	19.91					
10	64QAM	50	0	19.95					
Channel									
Frequency (MHz)									
5	QPSK	1	0	22.84	22.79	22.72			
5	QPSK	1	12	23.04	23.07	22.99	24	0	
5	QPSK	1	24	22.77	22.76	22.78			
5	QPSK	12	0	21.99	21.92	21.96			
5	QPSK	12	7	22.06	22.00	21.98	23	1	
5	QPSK	12	13	22.04	21.95	21.88			
5	QPSK	25	0	22.00	21.90	21.94			
5	16QAM	1	0	22.16	22.17	22.05			
5	16QAM	1	12	22.49	22.34	22.23	23	1	
5	16QAM	1	24	22.17	22.10	22.18			
5	16QAM	12	0	20.98	20.90	20.95			
5	16QAM	12	7	21.06	21.01	21.00			
5	16QAM	12	13	21.03	20.95	20.91	22	2	
5	16QAM	25	0	21.04	20.93	20.94			
5	64QAM	1	0	21.07	21.02	20.98			
5	64QAM	1	12	21.28	21.25	21.30	22	2	
5	64QAM	1	24	21.03	21.04	20.98			
5	64QAM	12	0	20.03	19.96	19.97			
5	64QAM	12	7	20.08	19.99	20.03	21	3	
5	64QAM	12	13	20.08	19.96	19.93			
5	64QAM	25	0	20.05	19.92	19.96			

Band 26									
BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)	
Channel									
Frequency (MHz)									
15	QPSK	1	0	21.62	21.68	21.67			
15	QPSK	1	37	22.09	22.11	22.01	23	0	
15	QPSK	1	74	21.75	21.87	21.83			
15	QPSK	36	0	20.86	20.96	20.94			
15	QPSK	36	20	20.91	21.06	21.04	22	1	
15	QPSK	36	39	20.83	20.97	20.95			
15	QPSK	75	0	20.85	20.98	20.96			



Band 66									
BW [MHz]	Modulation	RB Size	RB Offset	Channel	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel					132072	132322	132572		
Frequency (MHz)					1720	1745	1770		
20	QPSK	1	0		16.23	16.29	16.26	17.5	0
20	QPSK	1	49		16.58	16.70	16.48		
20	QPSK	1	99		16.16	16.18	16.01		
20	QPSK	50	0		15.38	15.74	15.53		
20	QPSK	50	24		15.30	15.52	15.49	16.5	1
20	QPSK	50	50		15.36	15.48	15.44		
20	QPSK	100	0		15.41	15.57	15.52		
20	16QAM	1	0		15.12	15.83	15.31		
20	16QAM	1	49		15.89	16.01	15.58	16.5	1
20	16QAM	1	99		15.15	15.03	15.57		
20	16QAM	50	0		14.20	14.53	14.30		
20	16QAM	50	24		14.15	14.43	14.29		
20	16QAM	50	50		14.17	14.29	14.18	15.5	2
20	16QAM	100	0		14.16	14.38	14.19		
20	64QAM	1	0		14.14	14.19	14.29		
20	64QAM	1	49		14.54	14.81	14.60	15.5	2
20	64QAM	1	99		14.27	14.47	14.10		
20	64QAM	50	0		13.22	13.53	13.35		
20	64QAM	50	24		13.33	13.46	13.32	14.5	3
20	64QAM	50	50		13.16	13.44	13.31		
20	64QAM	100	0		13.15	13.48	13.41		
Channel					132047	132322	132597		
Frequency (MHz)					1717.5	1745	1772.5		
15	QPSK	1	0		16.08	16.32	16.20	17.5	0
15	QPSK	1	37		16.26	16.36	16.36		
15	QPSK	1	74		16.11	16.11	15.96		
15	QPSK	36	0		15.35	15.32	15.29	16.5	1
15	QPSK	36	20		15.18	15.35	15.25		
15	QPSK	36	39		15.12	15.34	15.20		
15	QPSK	75	0		15.23	15.33	15.26		
15	16QAM	1	0		15.40	15.82	15.48		
15	16QAM	1	37		15.89	15.98	15.71	16.5	1
15	16QAM	1	74		15.68	15.87	15.29		
15	16QAM	36	0		14.14	14.44	14.19		
15	16QAM	36	20		14.12	14.40	14.16	15.5	2
15	16QAM	36	39		14.17	14.30	14.21		
15	16QAM	75	0		14.21	14.42	14.28		
15	64QAM	1	0		14.41	14.51	14.37		
15	64QAM	1	37		14.42	14.66	14.54	15.5	2
15	64QAM	1	74		14.50	14.59	14.29		
15	64QAM	36	0		13.29	13.49	13.37		
15	64QAM	36	20		13.27	13.38	13.22	14.5	3
15	64QAM	36	39		13.22	13.34	13.20		
15	64QAM	75	0		13.22	13.37	13.30		
Channel					132222	132322	132622		
Frequency (MHz)					1715	1745	1775		
10	QPSK	1	0		16.08	16.38	16.24	17.5	0
10	QPSK	1	25		16.30	16.33	16.37		
10	QPSK	1	49		16.01	16.23	16.04		
10	QPSK	25	0		15.09	15.46	15.29	16.5	1
10	QPSK	25	12		15.13	15.36	15.19		
10	QPSK	25	25		15.30	15.30	15.17		
10	QPSK	50	0		15.20	15.40	15.16		
10	16QAM	1	0		15.77	15.97	15.36	16.5	1
10	16QAM	1	25		15.78	15.82	15.21		
10	16QAM	1	49		15.38	15.56	15.73		
10	16QAM	25	0		14.17	14.44	14.18		
10	16QAM	25	12		14.15	14.46	14.10	15.5	2
10	16QAM	25	25		14.33	14.36	14.22		
10	16QAM	50	0		14.19	14.47	14.28		
10	64QAM	1	0		14.50	14.73	14.26	15.5	2
10	64QAM	1	25		14.63	14.60	14.08		
10	64QAM	1	49		14.15	14.39	14.33		
10	64QAM	25	0		13.26	13.44	13.24	14.5	3
10	64QAM	25	12		13.29	13.36	13.32		
10	64QAM	25	25		13.20	13.42	13.14		
10	64QAM	50	0		13.26	13.44	13.30		
Channel					131997	132322	132647		
Frequency (MHz)					1712.5	1745	1777.5		
5	QPSK	1	0		16.01	16.16	16.05	17.5	0
5	QPSK	1	12		16.38	16.37	16.34		
5	QPSK	1	24		15.96	16.11	16.02		
5	QPSK	12	0		15.11	15.39	15.19	16.5	1
5	QPSK	12	7		15.10	15.45	15.19		
5	QPSK	12	13		15.12	15.39	15.07		
5	QPSK	25	0		15.12	15.34	15.07		
5	16QAM	1	0		15.33	15.49	15.68	16.5	1
5	16QAM	1	12		15.68	15.64	15.59		
5	16QAM	1	24		15.56	15.43	15.02		
5	16QAM	12	0		14.03	14.44	14.03	15.5	2
5	16QAM	12	7		14.20	14.34	14.09		
5	16QAM	12	13		14.18	14.35	14.08		
5	16QAM	25	0		14.16	14.34	14.08		
5	64QAM	1	0		14.36	14.26	14.08	15.5	2
5	64QAM	1	12		14.32	14.39	14.54		
5	64QAM	1	24		14.11	14.39	14.39		
5	64QAM	12	0		13.21	13.49	13.36	14.5	3
5	64QAM	12	7		13.20	13.53	13.41		
5	64QAM	12	13		13.23	13.32	13.18		
5	64QAM	25	0		13.10	13.48	13.25		
Channel					131987	132322	132657		
Frequency (MHz)					1711.5	1745	1778.5		
3	QPSK	1	0		16.17	16.30	16.15	17.5	0
3	QPSK	1	8		16.05	16.28	16.19		
3	QPSK	1	14		16.05	16.31	16.22		
3	QPSK	8	0		15.09	15.39	15.21	16.5	1
3	QPSK	8	4		15.26	15.34	15.15		
3	QPSK	8	7		15.21	15.32	15.05		
3	QPSK	15	0		15.07	15.31	15.09		
3	16QAM	1	0		15.33	15.88	15.32	16.5	1
3	16QAM	1	8		15.41	15.48	15.80		
3	16QAM	1	14		15.35	15.91	15.73		
3	16QAM	8	0		14.23	14.52	14.26		
3	16QAM	8	4		14.38	14.45	14.37	15.5	2
3	16QAM	8	7		14.22	14.40	14.25		
3	16QAM	15	0		14.15	14.44	14.15		
3	64QAM	1	0		14.18	14.62	14.52	15.5	2
3	64QAM	1	8		14.45	14.59	14.55		
3	64QAM	1	14		14.27	14.42	14.09		
3	64QAM	8	0		13.21	13.37	13.14	14.5	3
3	64QAM	8	4		13.10	13.38	13.31		
3	64QAM	8	7		13.01	13.56	13.19		
3	64QAM	15	0		13.16	13.34	13.05		
Channel					131919	132322	132659		
Frequency (MHz)					1710.7	1745	1779.3		
1.4	QPSK	1	0		16.02	16.25	16.13	17.5	0
1.4	QPSK	1	3		16.23	16.33	16.16		
1.4	QPSK	1	5		16.04	16.28	16.04		
1.4	QPSK	3	0		16.16	16.37	16.29	16.5	1
1.4	QPSK	3	1		16.17	16.30	16.27		
1.4	QPSK	3	3		16.18	16.29	16.24		
1.4	QPSK	6	0		15.11	15.43	15.23	16.5	1
1.4	16QAM	1	0		15.72	15.61	15.79		
1.4	16QAM	1	3		15.82	15.88	15.41	16.5	1
1.4	16QAM	1	5		15.10	15.95	15.81		
1.4	16QAM	3	0		15.26	15.53	15.27		
1.4	16QAM	3	1		15.36	15.57	15.46		
1.4	16QAM	3	3		15.22	15.37	15.09		
1.4	16QAM	6	0		14.22	14.62	14.09	15.5	2
1.4	64QAM	1	0		14.44	14.29	14.14		
1.4	64QAM	1	3		14.70	14.75	14.08	15.5	2
1.4	64QAM	1	5		14.22	14.70	14.54		
1.4	64QAM	3	0		13.99	14.64	14.36		
1.4	64QAM	3	1		14.37	14.63	14.42		
1.4	64QAM	3	3		14.34	14.69	14.34		
1.4	64QAM	6	0		13.21	13.58	13.19	14.5	3

Band 38									
BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)	
Channel				37850	38000	38150			
Frequency (MHz)				2580	2595	2610			
20	QPSK	1	0	15.37	15.47	15.30	17	0	
20	QPSK	1	49	15.87	15.89	15.69			
20	QPSK	1	99	15.40	15.44	15.32			
20	QPSK	50	0	14.46	14.66	14.45	16	1	
20	QPSK	50	24	14.61	14.61	14.53			
20	QPSK	50	50	14.60	14.53	14.59			
20	QPSK	100	0	14.64	14.85	14.49	16	1	
20	16QAM	1	0	14.46	14.30	14.30			
20	16QAM	1	49	14.98	14.69	14.75			
20	16QAM	1	99	14.56	14.33	14.40	15	2	
20	16QAM	50	0	13.66	13.47	13.45			
20	16QAM	50	24	13.70	13.51	13.54			
20	16QAM	50	50	13.68	13.53	13.56	15	2	
20	16QAM	100	0	13.65	13.50	13.57			
20	64QAM	1	0	13.19	13.06	13.08			
20	64QAM	1	49	13.59	13.42	13.49	15	2	
20	64QAM	1	99	13.25	13.02	13.08			
20	64QAM	50	0	12.67	12.44	12.50			
20	64QAM	50	24	12.71	12.48	12.58	14	3	
20	64QAM	50	50	12.69	12.54	12.61			
20	64QAM	100	0	12.67	12.56	12.60			
Channel				37825	38000	38175			
Frequency (MHz)				2577.5	2595	2612.5			
15	QPSK	1	0	15.66	15.41	15.46	17	0	
15	QPSK	1	37	15.84	15.62	15.68			
15	QPSK	1	74	15.69	15.44	15.55			
15	QPSK	36	0	14.71	14.46	14.56	16	1	
15	QPSK	36	20	14.78	14.53	14.63			
15	QPSK	36	39	14.88	14.50	14.57			
15	QPSK	75	0	14.64	14.46	14.53	16	1	
15	16QAM	1	0	14.73	14.44	14.50			
15	16QAM	1	37	14.90	14.65	14.75			
15	16QAM	1	74	14.65	14.48	14.58	15	2	
15	16QAM	36	0	13.66	13.38	13.50			
15	16QAM	36	20	13.69	13.44	13.47			
15	16QAM	36	39	13.60	13.38	13.54	15	2	
15	16QAM	75	0	13.63	13.49	13.51			
15	64QAM	1	0	13.43	13.22	13.31			
15	64QAM	1	37	13.65	13.36	13.49	15	2	
15	64QAM	1	74	13.43	13.12	13.33			
15	64QAM	36	0	12.67	12.43	12.47			
15	64QAM	36	20	12.67	12.47	12.54	14	3	
15	64QAM	36	39	12.65	12.48	12.55			
15	64QAM	75	0	12.67	12.43	12.53			
Channel				37800	38000	38200			
Frequency (MHz)				2575	2595	2615			
10	QPSK	1	0	15.76	15.49	15.54	17	0	
10	QPSK	1	25	15.79	15.35	15.46			
10	QPSK	1	49	15.68	15.46	15.60			
10	QPSK	25	0	14.79	14.52	14.55	16	1	
10	QPSK	25	12	14.77	14.53	14.65			
10	QPSK	25	25	14.75	14.50	14.63			
10	QPSK	50	0	14.72	14.56	14.60	16	1	
10	16QAM	1	0	14.61	14.57	14.70			
10	16QAM	1	25	14.85	14.55	14.62			
10	16QAM	1	49	14.80	14.60	14.77	15	2	
10	16QAM	25	0	13.79	13.52	13.54			
10	16QAM	25	12	13.78	13.55	13.69			
10	16QAM	25	25	13.75	13.50	13.62	15	2	
10	16QAM	50	0	13.77	13.50	13.57			
10	64QAM	1	0	13.53	13.25	13.35			
10	64QAM	1	25	13.53	13.21	13.35	15	2	
10	64QAM	1	49	13.46	13.24	13.41			
10	64QAM	25	0	12.84	12.68	12.63			
10	64QAM	25	12	12.82	12.68	12.71	14	3	
10	64QAM	25	25	12.81	12.55	12.71			
10	64QAM	50	0	12.74	12.51	12.62			
Channel				37775	38000	38225			
Frequency (MHz)				2572.5	2595	2617.5			
5	QPSK	1	0	15.66	15.30	15.52	17	0	
5	QPSK	1	12	15.85	15.58	15.78			
5	QPSK	1	24	15.62	15.35	15.60			
5	QPSK	12	0	14.71	14.41	14.58	16	1	
5	QPSK	12	7	14.77	14.45	14.68			
5	QPSK	12	13	14.70	14.45	14.62			
5	QPSK	25	0	14.70	14.52	14.63	16	1	
5	16QAM	1	0	14.77	14.47	14.68			
5	16QAM	1	12	15.09	14.68	14.82			
5	16QAM	1	24	14.76	14.48	14.64	15	2	
5	16QAM	12	0	13.64	13.32	13.57			
5	16QAM	12	7	13.68	13.47	13.59			
5	16QAM	12	13	13.69	13.38	13.55	15	2	
5	16QAM	25	0	13.79	13.54	13.69			
5	64QAM	1	0	13.44	13.22	13.34			
5	64QAM	1	12	13.70	13.38	13.58	15	2	
5	64QAM	1	24	13.41	13.18	13.33			
5	64QAM	12	0	12.69	12.39	12.57			
5	64QAM	12	7	12.75	12.51	12.74	14	3	
5	64QAM	12	13	12.69	12.45	12.67			
5	64QAM	25	0	12.78	12.50	12.71			



Reduced Power Mode for Handheld On

GSM850 TX Channel	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	128	189	251		128	189	251	
Frequency (MHz)	824.2	836.4	848.8	824.2	836.4	848.8		
GSM 1 Tx slot	31.60	31.58	31.65	32.50	22.60	22.58	22.65	23.50
GPRS 1 Tx slot	31.62	31.64	31.68	32.50	22.62	22.64	22.68	23.50
GPRS 2 Tx slots	29.85	29.83	29.93	31.00	23.85	23.83	23.93	25.00
GPRS 3 Tx slots	28.73	28.72	28.80	29.00	24.47	24.46	24.54	24.74
GPRS 4 Tx slots	26.71	26.73	26.80	27.00	23.71	23.73	23.80	24.00
EDGE 1 Tx slot	25.96	25.93	26.03	27.00	16.96	16.93	17.03	18.00
EDGE 2 Tx slots	24.87	24.88	24.92	25.50	16.87	16.88	16.92	19.50
EDGE 3 Tx slots	22.32	22.31	22.46	23.50	16.06	16.05	16.20	19.24
EDGE 4 Tx slots	21.05	20.92	20.95	21.50	16.05	17.92	17.95	18.50

GSM1900 TX Channel	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	512	661	810		512	661	810	
Frequency (MHz)	1850.2	1880	1909.8		1850.2	1880	1909.8	
GSM 1 Tx slot	28.55	28.67	28.72	29.50	19.55	19.67	19.72	20.50
GPRS 1 Tx slot	26.58	26.69	26.75	29.50	19.58	19.69	19.75	20.50
GPRS 2 Tx slots	26.92	27.11	27.05	28.50	20.92	21.11	21.05	22.50
GPRS 3 Tx slots	25.80	25.91	26.02	26.50	21.54	21.65	21.76	22.24
GPRS 4 Tx slots	22.92	23.00	23.02	24.50	19.92	20.00	20.02	21.50
EDGE 1 Tx slot	25.09	25.11	25.06	26.00	16.09	16.11	16.06	17.00
EDGE 2 Tx slots	24.24	24.18	24.06	25.00	16.24	16.18	16.06	19.00
EDGE 3 Tx slots	22.29	22.06	22.09	23.00	16.03	17.80	17.83	18.74
EDGE 4 Tx slots	20.98	21.11	20.87	22.00	17.98	18.11	17.87	19.00

Band TX Channel	WCDMA II			Tune-up Limit (dBm)	WCDMA IV			Tune-up Limit (dBm)	WCDMA V			Tune-up Limit (dBm)	
	9262	9400	9538		1312	1413	1513		4132	4182	4233		
Rx Channel	9662	9800	9938		1537	1638	1738		4357	4407	4458		
Frequency (MHz)	1852.4	1880	1907.6		1712.4	1732.6	1752.6		826.4	836.4	846.6		
3GPP Rel 99	AMR 12.2Kbps	19.53	19.55	19.31	21.00	19.26	19.34	19.38	20.50	22.67	22.75	22.71	24.00
3GPP Rel 99	AMR 12.2Kbps	19.56	19.57	19.32	21.00	19.28	19.43	19.40	20.50	22.72	22.82	22.67	24.00
3GPP Rel 6	HSDPA Subtest-1	18.57	18.37	18.36	20.00	18.21	18.32	18.39	19.50	21.77	21.82	21.74	23.00
3GPP Rel 6	HSDPA Subtest-2	18.45	18.29	18.23	20.00	18.20	18.28	18.32	19.50	21.73	21.76	21.67	23.00
3GPP Rel 6	HSDPA Subtest-3	17.90	17.81	17.69	19.50	17.68	17.81	17.87	19.00	21.32	21.21	21.17	22.50
3GPP Rel 6	HSDPA Subtest-4	17.86	17.81	17.65	19.50	17.61	17.78	17.82	19.00	21.27	21.20	21.11	22.50
3GPP Rel 6	DC-HSDPA Subtest-1	18.58	18.40	18.31	20.00	18.17	18.32	18.39	19.50	21.75	21.79	21.77	23.00
3GPP Rel 6	DC-HSDPA Subtest-2	18.43	18.38	18.16	20.00	18.12	18.24	18.35	19.50	21.73	21.75	21.75	23.00
3GPP Rel 6	DC-HSDPA Subtest-3	17.85	17.91	17.67	19.50	17.69	17.79	17.88	19.00	21.35	21.38	21.36	22.50
3GPP Rel 6	DC-HSDPA Subtest-4	17.80	17.84	17.68	19.50	17.84	17.74	17.86	19.00	21.33	21.35	21.32	22.50
3GPP Rel 6	HSUPA Subtest-1	17.50	17.57	17.54	19.50	17.20	17.45	17.39	19.00	20.55	20.58	20.55	22.50
3GPP Rel 6	HSUPA Subtest-2	17.14	17.19	16.85	17.50	16.91	16.89	16.76	17.00	20.26	20.24	20.35	20.50
3GPP Rel 6	HSUPA Subtest-3	18.09	18.14	17.95	18.50	17.93	17.81	17.83	18.00	21.23	21.25	21.30	21.50
3GPP Rel 6	HSUPA Subtest-4	16.95	16.90	16.65	17.50	16.92	16.89	16.81	17.00	19.72	19.75	19.74	20.50
3GPP Rel 6	HSUPA Subtest-5	18.30	18.40	18.30	19.50	18.40	18.30	18.20	19.00	21.30	21.30	21.20	22.50



Band 2									
BW (MHz)	Modulation	RB Size	RB Offset	Power Low Ch./Freq.	Power Middle Ch./Freq.	Power High Ch./Freq.	Tune-up limit (dBm)	MPR (dB)	
Channel									
Frequency (MHz)									
20	QPSK	1	0	1847	1850	1853	21	0	
20	QPSK	1	49	1971	1972	1987			
20	QPSK	1	99	1925	1940	1929			
20	QPSK	50	0	1862	1877	1876			
20	QPSK	50	24	1860	1862	1870			
20	QPSK	50	50	1849	1859	1863			
20	QPSK	100	0	1866	1868	1867			
20	16QAM	1	0	1858	1857	1842			
20	16QAM	1	49	1823	1830	1852			
20	16QAM	1	99	1811	1879	1847			
20	16QAM	50	0	1766	1760	1756			
20	16QAM	50	24	1764	1756	1759			
20	16QAM	50	50	1744	1736	1749			
20	16QAM	100	0	1743	1753	1765			
20	84QAM	1	0	1766	1744	1757			
20	84QAM	1	49	1774	1779	1774			
20	84QAM	1	99	1732	1730	1752			
20	84QAM	50	0	1662	1661	1655			
20	84QAM	50	24	1649	1655	1647			
20	84QAM	50	50	1644	1647	1654			
20	84QAM	100	0	1662	1658	1656			
Channel									
Frequency (MHz)									
15	QPSK	1	0	1959	1949	1924	21	0	
15	QPSK	1	37	1948	1961	1957			
15	QPSK	1	74	1930	1917	1925			
15	QPSK	35	0	1865	1858	1851			
15	QPSK	35	20	1859	1852	1850			
15	QPSK	35	39	1843	1851	1843			
15	QPSK	75	0	1860	1858	1852			
15	16QAM	1	0	1876	1868	1864			
15	16QAM	1	37	1910	1901	1868			
15	16QAM	1	74	1838	1835	1836			
15	16QAM	35	0	1752	1761	1759			
15	16QAM	35	20	1754	1757	1754			
15	16QAM	35	39	1741	1748	1746			
15	16QAM	75	0	1759	1754	1749			
15	84QAM	1	0	1782	1770	1735			
15	84QAM	1	37	1807	1788	1780			
15	84QAM	1	74	1743	1735	1764			
15	84QAM	35	0	1659	1653	1658			
15	84QAM	35	20	1648	1645	1658			
15	84QAM	35	39	1649	1645	1649			
15	84QAM	75	0	1647	1645	1644			
Channel									
Frequency (MHz)									
10	QPSK	1	0	1951	1947	1951	21	0	
10	QPSK	1	25	1952	1956	1944			
10	QPSK	1	49	1932	1933	1937			
10	QPSK	25	0	1861	1846	1840			
10	QPSK	25	12	1860	1856	1852			
10	QPSK	25	25	1855	1854	1847			
10	QPSK	50	0	1861	1858	1849			
10	16QAM	1	0	1865	1873	1837			
10	16QAM	1	25	1920	1911	1880			
10	16QAM	1	49	1899	1897	1897			
10	16QAM	25	0	1763	1762	1749			
10	16QAM	25	12	1762	1753	1760			
10	16QAM	25	25	1748	1748	1746			
10	16QAM	50	0	1752	1755	1753			
10	84QAM	1	0	1787	1778	1738			
10	84QAM	1	25	1785	1785	1786			
10	84QAM	1	49	1775	1744	1788			
10	84QAM	25	0	1667	1654	1647			
10	84QAM	25	12	1654	1645	1638			
10	84QAM	25	25	1648	1654	1640			
10	84QAM	50	0	1657	1645	1647			
Channel									
Frequency (MHz)									
5	QPSK	1	0	1931	1935	1932	21	0	
5	QPSK	1	12	1936	1939	1951			
5	QPSK	1	24	1930	1929	1929			
5	QPSK	12	0	1853	1848	1843			
5	QPSK	12	7	1861	1853	1851			
5	QPSK	12	13	1852	1839	1844			
5	QPSK	25	0	1847	1844	1861			
5	16QAM	1	0	1841	1832	1825			
5	16QAM	1	12	1888	1865	1908			
5	16QAM	1	24	1909	1861	1845			
5	16QAM	12	0	1763	1751	1752			
5	16QAM	12	7	1760	1744	1762			
5	16QAM	12	13	1747	1750	1755			
5	16QAM	25	0	1757	1750	1749			
5	84QAM	1	0	1771	1729	1721			
5	84QAM	1	12	1800	1745	1761			
5	84QAM	1	24	1746	1757	1774			
5	84QAM	12	0	1656	1642	1645			
5	84QAM	12	7	1655	1654	1648			
5	84QAM	12	13	1655	1654	1649			
5	84QAM	25	0	1658	1657	1651			
Channel									
Frequency (MHz)									
3	QPSK	1	0	1952	1925	1953	21	0	
3	QPSK	1	8	1953	1937	1941			
3	QPSK	1	14	1944	1937	1939			
3	QPSK	8	0	1864	1856	1845			
3	QPSK	8	4	1851	1852	1845			
3	QPSK	8	7	1858	1854	1842			
3	QPSK	15	0	1851	1858	1847			
3	16QAM	1	0	1879	1860	1891			
3	16QAM	1	8	1920	1877	1902			
3	16QAM	1	14	1915	1854	1904			
3	16QAM	8	0	1770	1758	1742			
3	16QAM	8	4	1765	1759	1759			
3	16QAM	8	7	1773	1752	1738			
3	16QAM	15	0	1763	1739	1750			
3	84QAM	1	0	1791	1731	1757			
3	84QAM	1	8	1798	1739	1779			
3	84QAM	1	14	1788	1750	1748			
3	84QAM	8	0	1663	1656	1658			
3	84QAM	8	4	1662	1644	1650			
3	84QAM	8	7	1654	1642	1658			
3	84QAM	15	0	1658	1649	1635			
Channel									
Frequency (MHz)									
1.4	QPSK	1	0	1951	1943	1940	21	0	
1.4	QPSK	1	3	1956	1956	1934			
1.4	QPSK	1	5	1952	1945	1932			
1.4	QPSK	3	0	1954	1949	1943			
1.4	QPSK	3	1	1953	1953	1942			
1.4	QPSK	3	3	1957	1938	1959			
1.4	QPSK	6	0	1856	1862	1849			
1.4	16QAM	1	0	1849	1903	1861			
1.4	16QAM	1	3	1865	1864	1862			
1.4	16QAM	1	5	1911	1897	1846			
1.4	16QAM	3	0	1869	1839	1849			
1.4	16QAM	3	1	1874	1860	1873			
1.4	16QAM	3	3	1867	1852	1847			
1.4	16QAM	6	0	1777	1767	1753			
1.4	84QAM	1	0	1792	1759	1779			
1.4	84QAM	1	3	1795	1794	1774			
1.4	84QAM	1	5	1787	1778	1777			
1.4	84QAM	3	0	1782	1757	1766			
1.4	84QAM	3	1	1787	1758	1783			
1.4	84QAM	3	3	1777	1777	1746			
1.4	84QAM	6	0	1659	1665	1656			

Band 4									
BW (MHz)	Modulation	RB Size	RB Offset	Power Low Ch./Freq.	Power Middle Ch./Freq.	Power High Ch./Freq.	Tune-up limit (dBm)	MPR (dB)	
Channel									
Frequency (MHz)									
20	QPSK	1	0	1847	1830	1837	20	0	
20	QPSK	1	49	1885	1902	1882			
20	QPSK	1	99	1870	1872	1856			
20	QPSK	50	0	1793	1795	1764			
20	QPSK	50	24	1773	1764	1775			
20	QPSK	50	50	1769	1767	1772			
20	QPSK	100	0	1781	1788	1787			
20	16QAM	1	0	1791	1780	1770			
20	16QAM	1	49	1830	1836	1831			
20	16QAM	1	99	1778	1756	1771			
20	16QAM	50	0	1684	1672	1700			
20	16QAM	50	24	1687	1690	1673			
20	16QAM	50	50	1669	1670	1646			



Band 7									
BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)	
Channel				20850	21100	21350			
Frequency (MHz)				2510	2535	2560			
20	QPSK	1	0	16.39	16.27	16.40			
20	QPSK	1	49	16.45	16.74	16.88	18	0	
20	QPSK	1	99	16.24	16.37	16.55			
20	QPSK	50	0	15.49	15.64	15.83			
20	QPSK	50	24	15.41	15.81	15.82	17	1	
20	QPSK	50	50	15.42	15.88	15.80			
20	QPSK	100	0	15.48	15.63	15.81			
20	16QAM	1	0	15.05	15.52	15.93			
20	16QAM	1	49	15.08	16.28	15.99	17	1	
20	16QAM	1	99	15.80	15.89	15.49			
20	16QAM	50	0	14.38	14.62	14.64			
20	16QAM	50	24	14.47	14.60	14.66	16	2	
20	16QAM	50	50	14.51	14.76	14.81			
20	16QAM	100	0	14.48	14.64	14.73			
20	64QAM	1	0	14.13	14.67	14.68			
20	64QAM	1	49	14.84	14.58	15.14	16	2	
20	64QAM	1	99	14.83	14.70	14.74			
20	64QAM	50	0	13.39	13.58	13.74			
20	64QAM	50	24	13.47	13.72	13.67	15	3	
20	64QAM	50	50	13.66	13.70	13.71			
20	64QAM	100	0	13.46	13.74	13.89			
Channel				20825	21100	21375			
Frequency (MHz)				2507.5	2535	2562.5			
15	QPSK	1	0	16.36	16.58	16.49			
15	QPSK	1	37	16.60	16.68	16.73	18	0	
15	QPSK	1	74	16.29	16.52	16.58			
15	QPSK	36	0	15.41	15.59	15.92			
15	QPSK	36	20	15.55	15.73	15.79	17	1	
15	QPSK	36	39	15.49	15.68	15.78			
15	QPSK	75	0	15.43	15.66	15.76			
15	16QAM	1	0	15.76	15.68	15.97			
15	16QAM	1	37	16.04	16.17	16.11	17	1	
15	16QAM	1	74	15.54	16.13	15.58			
15	16QAM	36	0	14.41	14.63	14.62			
15	16QAM	36	20	14.42	14.73	14.95	16	2	
15	16QAM	36	39	14.54	14.63	14.79			
15	16QAM	75	0	14.36	14.66	14.57			
15	64QAM	1	0	14.61	14.85	14.76			
15	64QAM	1	37	14.80	14.97	14.88	16	2	
15	64QAM	1	74	14.74	14.65	14.67			
15	64QAM	36	0	13.34	13.62	13.67			
15	64QAM	36	20	13.42	13.74	13.89	15	3	
15	64QAM	36	39	13.42	13.81	13.76			
15	64QAM	75	0	13.41	13.72	13.74			
Channel				20950	21100	21400			
Frequency (MHz)				2505	2535	2565			
10	QPSK	1	0	16.30	16.55	16.49			
10	QPSK	1	25	16.43	16.62	16.80	18	0	
10	QPSK	1	49	16.34	16.53	16.85			
10	QPSK	25	0	15.30	15.61	15.71			
10	QPSK	25	12	15.43	15.62	15.62	17	1	
10	QPSK	25	25	15.44	15.60	15.73			
10	QPSK	50	0	15.44	15.67	15.68			
10	16QAM	1	0	15.22	15.78	16.16			
10	16QAM	1	25	15.65	16.19	16.19	17	1	
10	16QAM	1	49	15.65	15.84	16.22			
10	16QAM	25	0	14.24	14.46	14.52			
10	16QAM	25	12	14.38	14.66	14.69	16	2	
10	16QAM	25	25	14.34	14.73	14.78			
10	16QAM	50	0	14.37	14.59	14.81			
10	64QAM	1	0	14.63	14.73	14.63	16	2	
10	64QAM	1	25	14.50	15.04	15.20			
10	64QAM	1	49	14.73	14.82	14.98			
10	64QAM	25	0	13.42	13.68	13.82			
10	64QAM	25	12	13.43	13.56	13.87	15	3	
10	64QAM	25	25	13.47	13.76	13.80			
10	64QAM	50	0	13.39	13.77	13.66			
Channel				20775	21100	21425			
Frequency (MHz)				2502.5	2535	2567.5			
5	QPSK	1	0	16.18	16.46	16.62			
5	QPSK	1	12	16.42	16.70	16.64	18	0	
5	QPSK	1	24	16.16	16.52	16.52			
5	QPSK	12	0	15.43	15.67	15.66			
5	QPSK	12	7	15.42	15.68	15.77	17	1	
5	QPSK	12	13	15.24	15.53	15.80			
5	QPSK	25	0	15.33	15.54	15.67			
5	16QAM	1	0	15.48	15.64	15.85			
5	16QAM	1	12	15.76	15.94	16.54	17	1	
5	16QAM	1	24	15.50	15.75	15.82			
5	16QAM	12	0	14.36	14.58	14.60			
5	16QAM	12	7	14.33	14.67	14.81	16	2	
5	16QAM	12	13	14.34	14.56	14.82			
5	16QAM	25	0	14.30	14.68	14.71			
5	64QAM	1	0	14.23	14.49	14.60			
5	64QAM	1	12	14.67	14.89	15.13	16	2	
5	64QAM	1	24	14.30	14.74	14.57			
5	64QAM	12	0	13.34	13.58	13.64			
5	64QAM	12	7	13.37	13.62	13.84	15	3	
5	64QAM	12	13	13.24	13.65	13.64			
5	64QAM	25	0	13.36	13.52	13.67			

Band 13									
BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)	
Channel				23230					
Frequency (MHz)				23230					
10	QPSK	1	0	22.89					
10	QPSK	1	25	23.10			24	0	
10	QPSK	1	49	22.94					
10	QPSK	25	0	21.98					
10	QPSK	25	12	21.97			23	1	
10	QPSK	25	25	21.91					
10	QPSK	50	0	21.95					
10	16QAM	1	0	22.24					
10	16QAM	1	25	22.32			23	1	
10	16QAM	1	49	22.28					
10	16QAM	25	0	20.93					
10	16QAM	25	12	21.01			22	2	
10	16QAM	25	25	20.92					
10	16QAM	50	0	20.97					
10	64QAM	1	0	21.18					
10	64QAM	1	25	21.27			22	2	
10	64QAM	1	49	21.18					
10	64QAM	25	0	19.93					
10	64QAM	25	12	20.00			21	3	
10	64QAM	25	25	19.91					
10	64QAM	50	0	19.95					
Channel				23205	23230	23255			
Frequency (MHz)				779.5	782	784.5			
5	QPSK	1	0	22.84	22.79	22.72			
5	QPSK	1	12	23.04	23.07	22.99	24	0	
5	QPSK	1	24	22.77	22.76	22.78			
5	QPSK	12	0	21.99	21.92	21.96			
5	QPSK	12	7	22.06	22.00	21.98	23	1	
5	QPSK	12	13	22.04	21.95	21.88			
5	QPSK	25	0	22.00	21.90	21.94			
5	16QAM	1	0	22.16	22.17	22.05			
5	16QAM	1	12	22.49	22.34	22.23	23	1	
5	16QAM	1	24	22.17	22.10	22.18			
5	16QAM	12	0	20.98	20.90	20.95			
5	16QAM	12	7	21.06	21.01	21.00	22	2	
5	16QAM	12	13	21.03	20.95	20.91			
5	16QAM	25	0	21.04	20.93	20.94			
5	64QAM	1	0	21.07	21.02	20.98			
5	64QAM	1	12	21.28	21.25	21.30	22	2	
5	64QAM	1	24	21.03	21.04	20.98			
5	64QAM	12	0	20.03	19.96	19.97			
5	64QAM	12	7	20.08	19.99	20.03	21	3	
5	64QAM	12	13	20.08	19.96	19.93			
5	64QAM	25	0	20.05	19.92	19.96			
Channel				26970	26865	26960			
Frequency (MHz)				819	831.5	844			
10	QPSK	1	0	22.71	22.70	22.72			
10	QPSK	1	25	22.86	22.92	22.89	24	0	



Band 66								
BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				132072	132322	132572		
Frequency (MHz)				1720	1745	1770		
20	QPSK	1	0	18.39	18.55	18.38	20	0
20	QPSK	1	49	18.68	19.03	18.73		
20	QPSK	1	99	18.43	18.55	18.32		
20	QPSK	50	0	17.70	17.99	17.82	19	1
20	QPSK	50	24	17.67	17.90	17.72		
20	QPSK	50	50	17.87	17.85	17.76		
20	QPSK	100	0	17.57	17.94	17.75		
20	16QAM	1	0	18.16	17.83	17.53	19	1
20	16QAM	1	49	18.49	18.21	18.29		
20	16QAM	1	99	17.81	17.82	17.94		
20	16QAM	50	0	16.66	17.07	16.89	18	2
20	16QAM	50	24	16.71	16.82	16.72		
20	16QAM	50	50	16.70	16.85	16.74		
20	16QAM	100	0	16.56	17.00	16.78		
20	64QAM	1	0	16.75	16.96	16.79	18	2
20	64QAM	1	49	16.87	16.98	17.20		
20	64QAM	1	99	16.76	16.85	16.43		
20	64QAM	50	0	15.71	15.95	15.75	17	3
20	64QAM	50	24	15.80	15.84	15.74		
20	64QAM	50	50	15.66	15.84	15.75		
20	64QAM	100	0	15.75	15.96	15.72		
Channel				132047	132322	132597		
Frequency (MHz)				1717.5	1745	1772.5		
15	QPSK	1	0	18.53	18.80	18.64	20	0
15	QPSK	1	37	18.68	18.80	18.70		
15	QPSK	1	74	18.50	18.85	18.49		
15	QPSK	36	0	17.85	17.96	17.75	19	1
15	QPSK	36	20	17.73	17.97	17.81		
15	QPSK	36	36	17.82	17.80	17.77		
15	QPSK	75	0	17.56	17.81	17.78		
15	16QAM	1	0	18.17	18.39	18.28	19	1
15	16QAM	1	37	17.86	18.14	17.83		
15	16QAM	1	74	18.18	18.32	17.82		
15	16QAM	36	0	16.67	16.88	16.69	18	2
15	16QAM	36	20	16.71	16.89	16.71		
15	16QAM	36	36	16.54	16.79	16.61		
15	16QAM	75	0	16.77	16.85	16.77		
15	64QAM	1	0	17.00	16.92	16.97	18	2
15	64QAM	1	37	16.85	17.29	16.72		
15	64QAM	1	74	16.68	17.07	16.75		
15	64QAM	36	0	15.64	15.89	15.81	17	3
15	64QAM	36	20	15.68	15.97	15.79		
15	64QAM	36	36	15.76	15.74	15.73		
15	64QAM	75	0	15.62	15.96	15.75		
Channel				132022	132322	132622		
Frequency (MHz)				1715	1745	1775		
10	QPSK	1	0	18.57	18.84	18.67	20	0
10	QPSK	1	25	18.82	18.88	18.76		
10	QPSK	1	49	18.51	18.79	18.59		
10	QPSK	25	0	17.69	17.91	17.71	19	1
10	QPSK	25	12	17.67	17.87	17.81		
10	QPSK	25	25	17.63	17.83	17.64		
10	QPSK	50	0	17.85	17.96	17.75		
10	16QAM	1	0	18.36	18.40	17.70	19	1
10	16QAM	1	25	17.97	18.17	17.83		
10	16QAM	1	49	18.31	18.38	17.91		
10	16QAM	25	0	16.72	16.98	16.72	18	2
10	16QAM	25	12	16.67	17.08	16.81		
10	16QAM	25	25	16.63	16.97	16.68		
10	16QAM	50	0	16.70	16.86	16.75		
10	64QAM	1	0	17.06	17.04	17.03	18	2
10	64QAM	1	25	17.17	17.32	16.94		
10	64QAM	1	49	16.71	17.00	16.96		
10	64QAM	25	0	15.69	15.98	15.76	17	3
10	64QAM	25	12	15.73	15.97	15.68		
10	64QAM	25	25	15.64	15.74	15.67		
10	64QAM	50	0	15.63	15.84	15.66		
Channel				131997	132322	132647		
Frequency (MHz)				1712.5	1745	1777.5		
5	QPSK	1	0	18.52	18.66	18.49	20	0
5	QPSK	1	12	18.87	18.78	18.80		
5	QPSK	1	24	18.40	18.50	18.47		
5	QPSK	12	0	17.83	17.94	17.64	19	1
5	QPSK	12	7	17.77	17.87	17.72		
5	QPSK	12	13	17.62	17.86	17.63		
5	QPSK	25	0	17.66	17.82	17.57		
5	16QAM	1	0	17.77	17.81	18.26	19	1
5	16QAM	1	12	18.25	18.22	17.92		
5	16QAM	1	24	18.18	17.77	18.14		
5	16QAM	12	0	16.61	16.92	16.72	18	2
5	16QAM	12	7	16.70	16.88	16.74		
5	16QAM	12	13	16.67	16.83	16.60		
5	16QAM	25	0	16.63	16.96	16.83		
5	64QAM	1	0	16.97	16.97	16.96	18	2
5	64QAM	1	12	16.90	17.29	17.11		
5	64QAM	1	24	16.89	16.55	16.69		
5	64QAM	12	0	15.64	15.86	15.57	17	3
5	64QAM	12	7	15.69	15.98	15.69		
5	64QAM	12	13	15.79	15.77	15.62		
5	64QAM	25	0	15.51	15.83	15.69		
Channel				131987	132322	132697		
Frequency (MHz)				1711.5	1745	1778.5		
3	QPSK	1	0	18.47	18.75	18.71	20	0
3	QPSK	1	8	18.56	18.82	18.52		
3	QPSK	1	14	18.58	18.78	18.61		
3	QPSK	8	0	17.65	17.95	17.74	19	1
3	QPSK	8	4	17.76	17.91	17.77		
3	QPSK	8	7	17.85	17.89	17.59		
3	QPSK	15	0	17.62	17.90	17.68		
3	16QAM	1	0	17.94	18.52	17.69	19	1
3	16QAM	1	8	17.95	18.47	17.97		
3	16QAM	1	14	17.55	18.13	17.82		
3	16QAM	8	0	16.62	16.94	16.58	18	2
3	16QAM	8	4	16.61	17.08	16.76		
3	16QAM	8	7	16.73	17.04	16.82		
3	16QAM	15	0	16.60	16.88	16.76		
3	64QAM	1	0	16.87	17.14	16.52	18	2
3	64QAM	1	8	16.93	16.78	17.00		
3	64QAM	1	14	16.50	17.10	17.02		
3	64QAM	8	0	15.64	15.96	15.71	17	3
3	64QAM	8	4	15.67	15.83	15.69		
3	64QAM	8	7	15.84	16.03	15.70		
3	64QAM	15	0	15.59	15.85	15.71		
Channel				131970	132322	132695		
Frequency (MHz)				1710.7	1745	1773.5		
1.4	QPSK	1	0	18.53	18.76	18.63	20	0
1.4	QPSK	1	3	18.63	18.96	18.54		
1.4	QPSK	1	5	18.55	18.72	18.46		
1.4	QPSK	3	0	18.69	18.80	18.68	19	1
1.4	QPSK	3	1	18.70	18.74	18.63		
1.4	QPSK	3	3	18.66	18.87	18.62		
1.4	QPSK	6	0	17.73	17.81	17.67		
1.4	16QAM	1	0	17.81	18.09	18.22	19	1
1.4	16QAM	1	3	18.30	18.07	17.69		
1.4	16QAM	1	5	17.87	18.05	17.90		
1.4	16QAM	3	0	17.89	17.74	17.53	18	2
1.4	16QAM	3	1	17.61	18.14	18.01		
1.4	16QAM	3	3	17.64	17.88	17.71		
1.4	16QAM	6	0	16.95	16.96	16.61		
1.4	64QAM	1	0	17.01	16.84	16.83	18	2
1.4	64QAM	1	3	16.91	17.24	16.58		
1.4	64QAM	1	5	16.45	17.16	16.96		
1.4	64QAM	3	0	16.74	17.05	16.81	17	3
1.4	64QAM	3	1	16.85	17.18	17.03		
1.4	64QAM	3	3	16.67	16.72	16.70		
1.4	64QAM	6	0	15.64	15.85	15.76		



Band 38									
BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)	
Channel				37850	38000	38150			
Frequency (MHz)				2580	2595	2610			
20	QPSK	1	0	19.35	19.12	19.14	20.5	0	
20	QPSK	1	49	19.63	19.64	19.53			
20	QPSK	1	99	19.33	19.13	19.23			
20	QPSK	50	0	18.67	18.68	18.49	19.5	1	
20	QPSK	50	24	18.67	18.47	18.57			
20	QPSK	50	50	18.62	18.54	18.60			
20	QPSK	100	0	18.63	18.66	18.56	19.5	1	
20	16QAM	1	0	18.67	18.43	18.51			
20	16QAM	1	49	18.94	18.82	18.83			
20	16QAM	1	99	18.68	18.51	18.56	18.5	2	
20	16QAM	50	0	17.72	17.54	17.55			
20	16QAM	50	24	17.72	17.52	17.60			
20	16QAM	50	50	17.73	17.56	17.61	18.5	2	
20	16QAM	100	0	17.68	17.52	17.55			
20	64QAM	1	0	17.45	17.25	17.31			
20	64QAM	1	49	17.83	17.67	17.66	18.5	2	
20	64QAM	1	99	17.49	17.30	17.35			
20	64QAM	50	0	16.70	16.51	16.53			
20	64QAM	50	24	16.71	16.52	16.60	17.5	3	
20	64QAM	50	50	16.73	16.57	16.65			
20	64QAM	100	0	16.68	16.56	16.58			
Channel				37825	38000	38175	Tune-up limit (dBm)	MPR (dB)	
Frequency (MHz)				2577.5	2595	2612.5			
15	QPSK	1	0	19.55	19.34	19.60	20.5	0	
15	QPSK	1	37	19.57	19.50	19.57			
15	QPSK	1	74	19.60	19.38	19.53			
15	QPSK	36	0	18.71	18.44	18.56	19.5	1	
15	QPSK	36	20	18.77	18.54	18.58			
15	QPSK	36	39	18.65	18.55	18.63			
15	QPSK	75	0	18.73	18.52	18.63	19.5	1	
15	16QAM	1	0	18.85	18.62	18.72			
15	16QAM	1	37	18.97	18.69	18.81			
15	16QAM	1	74	18.82	18.60	18.74	18.5	2	
15	16QAM	36	0	17.66	17.43	17.49			
15	16QAM	36	20	17.66	17.49	17.59			
15	16QAM	36	39	17.65	17.44	17.58	18.5	2	
15	16QAM	75	0	17.69	17.51	17.61			
15	64QAM	1	0	17.68	17.41	17.51			
15	64QAM	1	37	17.83	17.57	17.63	18.5	2	
15	64QAM	1	74	17.68	17.44	17.55			
15	64QAM	36	0	16.67	16.47	16.54			
15	64QAM	36	20	16.73	16.49	16.60	17.5	3	
15	64QAM	36	39	16.69	16.50	16.61			
15	64QAM	75	0	16.67	16.52	16.59			
Channel				37800	38000	38200	Tune-up limit (dBm)	MPR (dB)	
Frequency (MHz)				2575	2595	2615			
10	QPSK	1	0	19.57	19.36	19.50	20.5	0	
10	QPSK	1	25	19.54	19.46	19.60			
10	QPSK	1	49	19.62	19.41	19.54			
10	QPSK	25	0	18.80	18.53	18.61	19.5	1	
10	QPSK	25	12	18.88	18.57	18.69			
10	QPSK	25	25	18.80	18.58	18.65			
10	QPSK	50	0	18.78	18.59	18.65	19.5	1	
10	16QAM	1	0	18.97	18.65	18.81			
10	16QAM	1	25	19.00	18.80	18.89			
10	16QAM	1	49	18.96	18.73	18.86	18.5	2	
10	16QAM	25	0	17.85	17.56	17.68			
10	16QAM	25	12	17.84	17.61	17.69			
10	16QAM	25	25	17.85	17.65	17.76	18.5	2	
10	16QAM	50	0	17.80	17.61	17.74			
10	64QAM	1	0	17.79	17.54	17.61			
10	64QAM	1	25	17.78	17.63	17.79	18.5	2	
10	64QAM	1	49	17.74	17.52	17.67			
10	64QAM	25	0	16.87	16.62	16.70			
10	64QAM	25	12	16.87	16.65	16.77	17.5	3	
10	64QAM	25	25	16.83	16.64	16.76			
10	64QAM	50	0	16.77	16.61	16.68			
Channel				37775	38000	38225	Tune-up limit (dBm)	MPR (dB)	
Frequency (MHz)				2572.5	2595	2617.5			
5	QPSK	1	0	19.58	19.27	19.45	20.5	0	
5	QPSK	1	12	19.57	19.34	19.54			
5	QPSK	1	24	19.54	19.30	19.40			
5	QPSK	12	0	18.86	18.48	18.64	19.5	1	
5	QPSK	12	7	18.71	18.52	18.65			
5	QPSK	12	13	18.79	18.50	18.67			
5	QPSK	25	0	18.79	18.48	18.70	19.5	1	
5	16QAM	1	0	18.89	18.53	18.68			
5	16QAM	1	12	18.99	18.71	18.89			
5	16QAM	1	24	18.84	18.63	18.76	18.5	2	
5	16QAM	12	0	17.91	17.48	17.72			
5	16QAM	12	7	17.77	17.55	17.72			
5	16QAM	12	13	17.79	17.55	17.69	18.5	2	
5	16QAM	25	0	17.86	17.54	17.74			
5	64QAM	1	0	17.73	17.40	17.61			
5	64QAM	1	12	17.73	17.53	17.75	18.5	2	
5	64QAM	1	24	17.68	17.46	17.64			
5	64QAM	12	0	16.77	16.48	16.57			
5	64QAM	12	7	16.85	16.54	16.75	17.5	3	
5	64QAM	12	13	16.79	16.53	16.67			
5	64QAM	25	0	16.82	16.56	16.74			



Conducted Power for WLAN/BT

2.4GHz WLAN			Full Power (Default Power)			Receiver on		Hotspot On		Sensor on		
Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Duty Cycle %	
2.4GHz WLAN	802.11b 1Mbps	1	2412	18.60	20.00	18.60	20.00	16.50	18.00	16.50	18.00	99.27
		6	2437	19.10	20.00	19.10	20.00	17.00	18.00	17.00	18.00	
		11	2462	18.90	20.00	18.90	20.00	16.80	18.00	16.80	18.00	
	802.11g 6Mbps	1	2412	14.90	16.50	14.90	16.50	14.90	16.50	14.90	16.50	96.97
		6	2437	17.50	18.50	17.50	18.50	16.60	17.50	16.60	17.50	
		11	2462	14.30	15.50	14.30	15.50	14.30	15.50	14.30	15.50	
802.11n-HT20 MCS0	1	2412	13.80	15.50	13.80	15.50	13.80	15.50	13.80	15.50	96.78	
	6	2437	17.50	18.50	17.50	18.50	16.40	17.50	16.40	17.50		
	11	2462	15.00	16.50	15.00	16.50	15.00	16.50	15.00	16.50		

5.2GHz WLAN			Full Power (Default Power)			Receiver on		Hotspot On		Sensor on								
Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Duty Cycle %							
5.2GHz WLAN	802.11a 6Mbps	36	5180	14.54	15.50	Not Required	Not Required	Not Required	Not Required	Not Required	Not Required	96.97						
		40	5200	15.89	17.50													
		44	5220	14.63	15.50													
		48	5240	14.65	15.50													
	802.11n-HT20 MCS0	36	5180	14.24	15.50													
		40	5200	15.21	17.00													
		44	5220	14.30	15.50													
		48	5240	14.40	15.50													
	802.11n-HT40 MCS0	38	5190	12.54	14.50													
		46	5230	14.32	16.00													
	802.11ac-VHT20 MCS0	36	5180	14.18	16.00													
		40	5200	14.03	16.00													
		44	5220	14.23	16.00													
		48	5240	14.34	16.00													
	802.11ac-VHT40 MCS0	38	5190	12.49	14.00													
		46	5230	14.25	16.00													
	802.11ac-VHT80 MCS0	42	5210	12.20	14.00							11.00	12.00	9.70	11.00	11.00	12.00	87.77

5.3GHz WLAN			Full Power (Default Power)			Receiver on		Sensor on							
Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Duty Cycle %						
5.3GHz WLAN	802.11a 6Mbps	52	5260	17.38	18.00	Not Required	Not Required	Not Required	Not Required	Not Required	96.97				
		56	5280	17.48	18.00										
		60	5300	17.36	18.00										
		64	5320	16.41	17.00										
	802.11n-HT20 MCS0	52	5260	16.98	17.50										
		56	5280	16.95	17.50										
		60	5300	16.99	17.50										
		64	5320	15.97	17.50										
	802.11n-HT40 MCS0	54	5270	15.99	16.50										
		62	5310	13.21	14.00										
	802.11ac-VHT20 MCS0	52	5260	15.98	16.50										
		56	5280	15.93	16.50										
		60	5300	15.92	16.50										
		64	5320	15.93	16.50										
	802.11ac-VHT40 MCS0	54	5270	15.87	16.50										
		62	5310	13.16	14.00										
	802.11ac-VHT80 MCS0	58	5290	11.69	12.50						11.00	12.00	11.00	12.00	87.77

5.5GHz WLAN			Full Power (Default Power)			Receiver on		Sensor on							
Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Duty Cycle %						
5.5GHz WLAN	802.11a 6Mbps	100	5500	16.98	17.50	Not Required	Not Required	Not Required	Not Required	Not Required	96.97				
		118	5580	16.97	17.50										
		124	5620	16.98	17.50										
		132	5660	16.91	17.50										
		140	5700	16.26	17.00										
		144	5720	16.96	17.50										
	802.11n-HT20 MCS0	100	5500	14.94	15.50										
		118	5580	16.29	17.00										
		124	5620	16.48	17.00										
		132	5660	16.46	17.00										
		140	5700	12.43	13.00										
		144	5720	16.38	17.00										
	802.11n-HT40 MCS0	102	5510	12.58	13.00										
		110	5550	15.46	16.00										
		126	5630	15.32	16.00										
		134	5670	15.41	16.00										
	802.11ac-VHT20 MCS0	100	5500	14.87	15.50										
		118	5580	15.35	16.00										
		124	5620	15.45	16.00										
		132	5660	15.46	16.00										
		140	5700	12.40	13.00										
		144	5720	15.38	16.00										
	802.11ac-VHT40 MCS0	102	5510	12.54	13.00										
		110	5550	15.39	16.00										
		126	5630	15.30	16.00										
		134	5670	15.35	16.00										
	802.11ac-VHT80 MCS0	106	5530	13.52	14.00						11.19	12.00	11.19	12.00	87.77
		122	5610	15.42	16.00						11.41	12.00	11.41	12.00	
		138	5690	15.40	16.00						11.37	12.00	11.37	12.00	

5.8GHz WLAN			Full Power (Default Power)			Receiver on		Hotspot On		Sensor on						
Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Duty Cycle %					
5.8GHz WLAN	802.11a 6Mbps	149	5745	16.81	17.50	Not Required	Not Required	Not Required	Not Required	Not Required	96.97					
		157	5785	16.57	17.50											
		165	5825	16.47	17.50											
	802.11n-HT20 MCS0	149	5745	15.82	17.00											
		157	5785	15.50	17.00											
		165	5825	15.34	17.00											
	802.11n-HT40 MCS0	151	5755	15.15	16.00											
		159	5795	14.86	16.00											
		149	5745	15.16	16.00											
	802.11ac-VHT20 MCS0	157	5785	15.01	16.00											
		165	5825	14.78	16.00											
		151	5755	15.11	16.00											
	802.11ac-VHT40 MCS0	159	5795	14.80	16.00											
		155	5775	14.58	16.00						10.70	11.50	9.90	11.50	11.50	12.50



BT BR/EDR

Mode	Channel	Frequency (MHz)	Average power (dBm)									Tune-up Limit
			Packet Type									
			DH1	DH3	DH5	2DH1	2DH3	2DH5	3DH1	3DH3	3DH5	
Bluetooth	CH 0	2402	9.90	9.90	10.00	7.60	7.60	7.70	7.60	7.60	7.70	12
	CH 39	2441	9.60	9.60	10.00	7.60	7.60	7.70	7.60	7.60	7.70	12
	CH 78	2480	10.40	10.40	10.50	8.10	8.10	8.20	8.10	8.10	8.20	12

BT LE

Mode	Channel	Frequency (MHz)	Average power (dBm)	
			1Mbps	2Mbps
LE	CH 00	2402	-2.20	-2.30
	CH 19	2440	-1.50	-1.60
	CH 39	2480	-2.60	-2.70
Tune-up Limit			7.50	7.50