



Accreditation No.: **SCS 0108**

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Client **Sporton**

Certificate No: **EX3-3843_Sep19**

CALIBRATION CERTIFICATE

Object **EX3DV4 - SN:3843**

Calibration procedure(s) **QA CAL-01.v9, QA CAL-14.v5, QA CAL-23.v5, QA CAL-25.v7
Calibration procedure for dosimetric E-field probes**

Calibration date: **September 26, 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: S5277 (20x)	04-Apr-19 (No. 217-02894)	Apr-20
DAE4	SN: 660	19-Dec-18 (No. DAE4-660_Dec18)	Dec-19
Reference Probe ES3DV2	SN: 3013	31-Dec-18 (No. ES3-3013_Dec18)	Dec-19
Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-16)	In house check: Jun-20
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-18)	In house check: Jun-20
Network Analyzer E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19

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

Issued: October 1, 2019

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



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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), i.e., $\vartheta = 0$ 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 $\vartheta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not affect the E²-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 with CW signal (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}; D_{x,y,z}; VR_{x,y,z}; A, B, C, D** 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 $f \leq 800$ MHz) and inside waveguide using analytical field distributions based on power measurements for $f > 800$ MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values 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 ± 50 MHz to ± 100 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).

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3843

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu\text{V}/(\text{V}/\text{m})^2$) ^A	0.34	0.35	0.25	± 10.1 %
DCP (mV) ^B	110.9	96.1	101.1	

Calibration Results for Modulation Response

UID	Communication System Name		A dB	B dB $\sqrt{\mu\text{V}}$	C	D dB	VR mV	Max dev.	Unc ^C (k=2)
0	CW	X	0.0	0.0	1.0	0.00	134.1	±3.8 %	± 4.7 %
		Y	0.0	0.0	1.0		146.5		
		Z	0.0	0.0	1.0		132.2		

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 5).

^B Numerical linearization parameter; uncertainty not required.

^C 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:3843**Other Probe Parameters**

Sensor Arrangement	Triangular
Connector Angle (°)	-34.3
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3843

Calibration Parameter Determined in Head Tissue Simulating Media

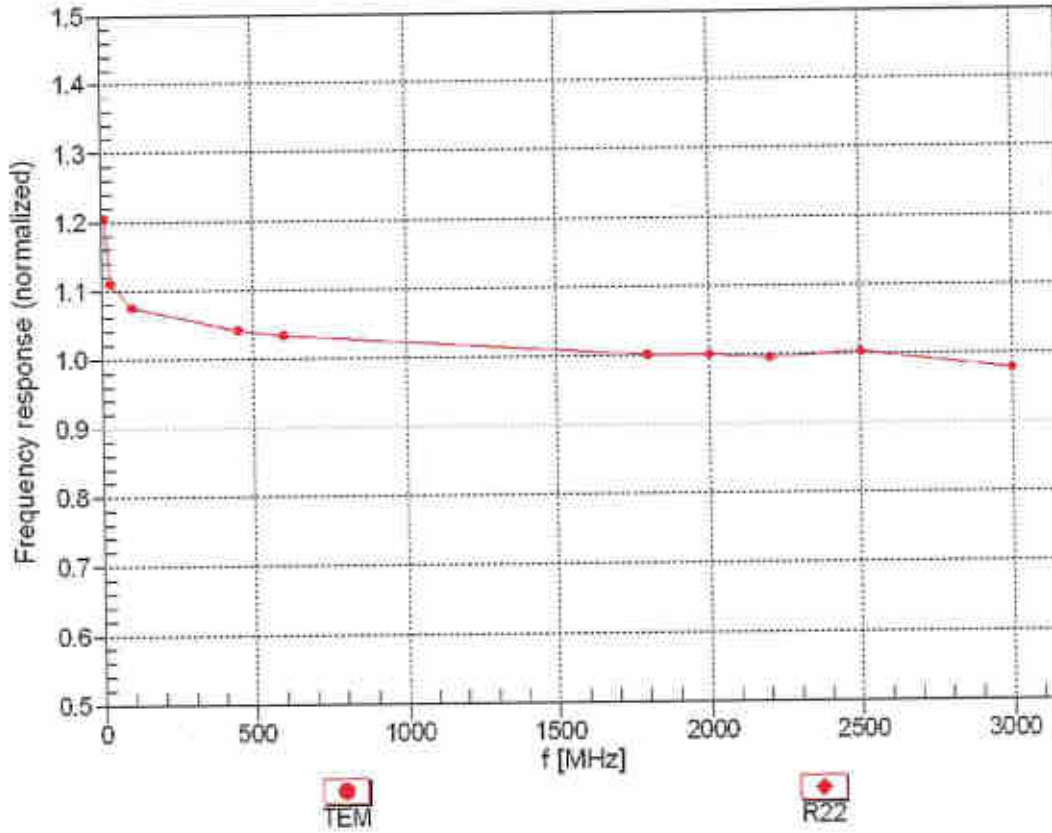
f (MHz) ^C	Relative Permittivity ^F	Conductivity (S/m) ^F	ConvF X	ConvF Y	ConvF Z	Alpha ^G	Depth ^G (mm)	Unc (k=2)
750	41.9	0.89	9.37	9.37	9.37	0.50	0.87	± 12.0 %
835	41.5	0.90	9.07	9.07	9.07	0.43	0.80	± 12.0 %
900	41.5	0.97	8.92	8.92	8.92	0.41	0.90	± 12.0 %
1450	40.5	1.20	8.17	8.17	8.17	0.32	0.80	± 12.0 %
1750	40.1	1.37	7.95	7.95	7.95	0.34	0.87	± 12.0 %
1900	40.0	1.40	7.67	7.67	7.67	0.32	0.87	± 12.0 %
2000	40.0	1.40	7.66	7.66	7.66	0.34	0.87	± 12.0 %
2300	39.5	1.67	7.30	7.30	7.30	0.26	0.90	± 12.0 %
2450	39.2	1.80	7.06	7.06	7.06	0.35	0.90	± 12.0 %
2600	39.0	1.96	6.90	6.90	6.90	0.43	0.80	± 12.0 %
5250	35.9	4.71	4.74	4.74	4.74	0.40	1.80	± 14.0 %
5600	35.5	5.07	4.47	4.47	4.47	0.40	1.80	± 14.0 %
5750	35.4	5.22	4.44	4.44	4.44	0.40	1.80	± 14.0 %

^C Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the 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. Validity of ConvF assessed at 6 MHz is 4-9 MHz, and ConvF assessed at 13 MHz is 9-19 MHz. Above 5 GHz frequency validity can be extended to ± 110 MHz.

^F At frequencies 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 frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

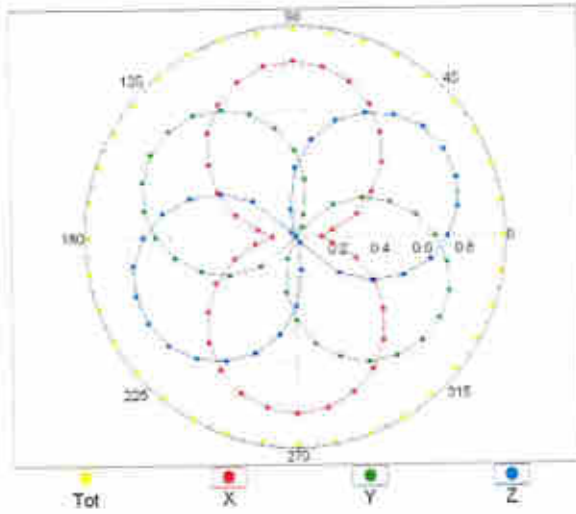
Frequency Response of E-Field (TEM-Cell:ifi110 EXX, Waveguide: R22)



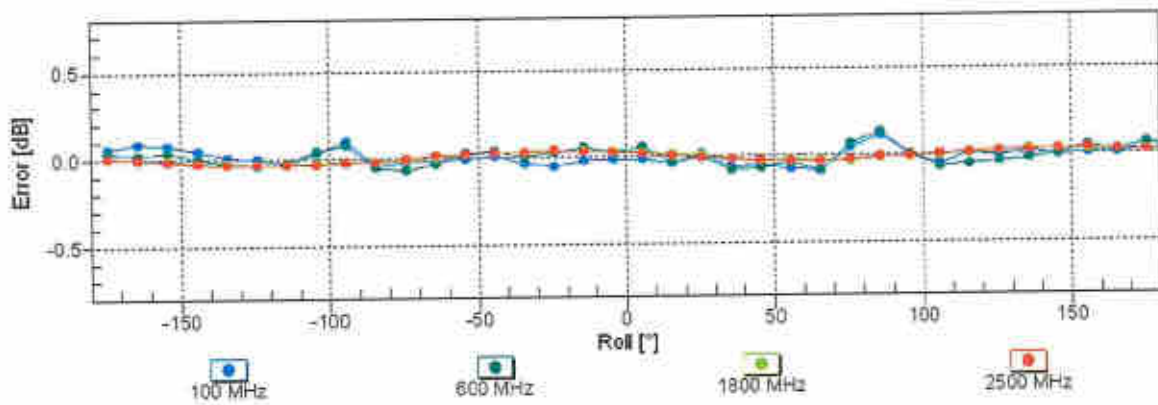
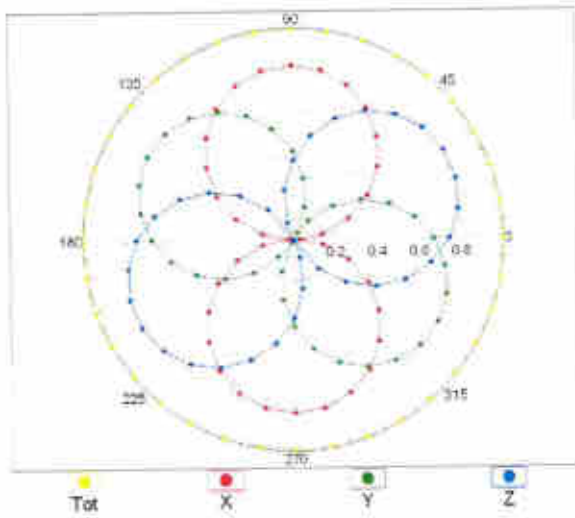
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ (k=2)

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

f=600 MHz,TEM

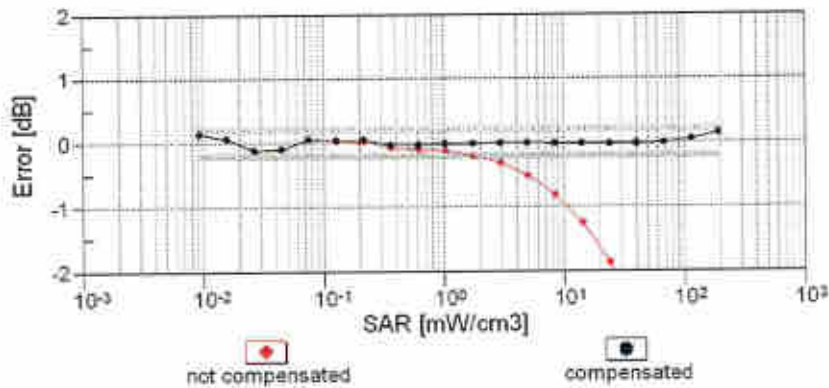
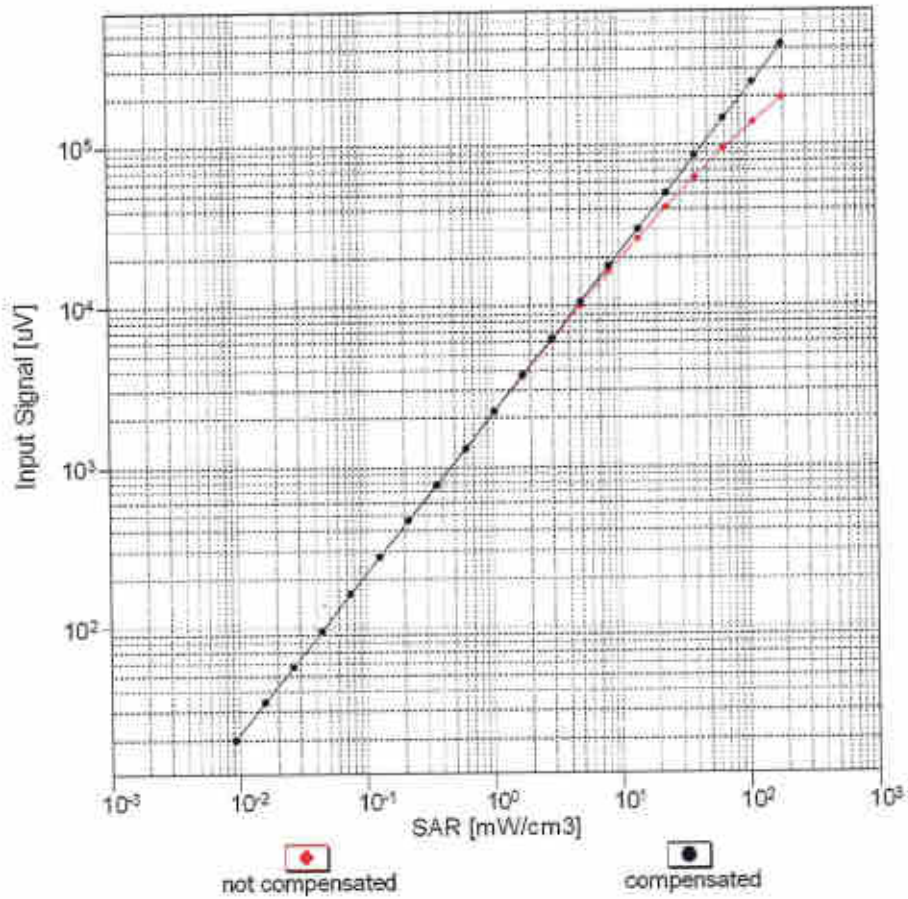


f=1800 MHz,R22



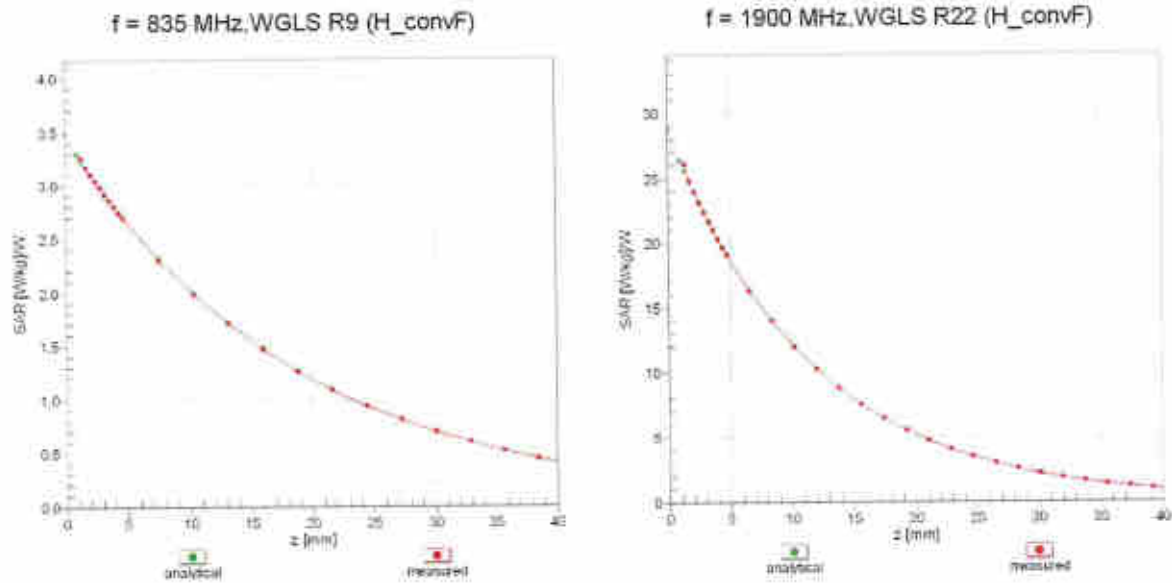
Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

Dynamic Range f(SAR_{head}) (TEM cell , f_{eval}= 1900 MHz)

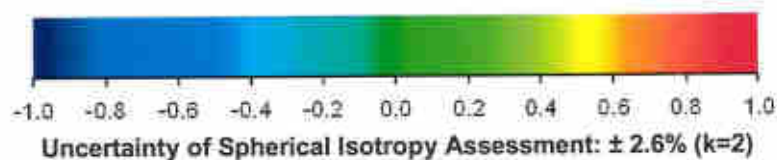
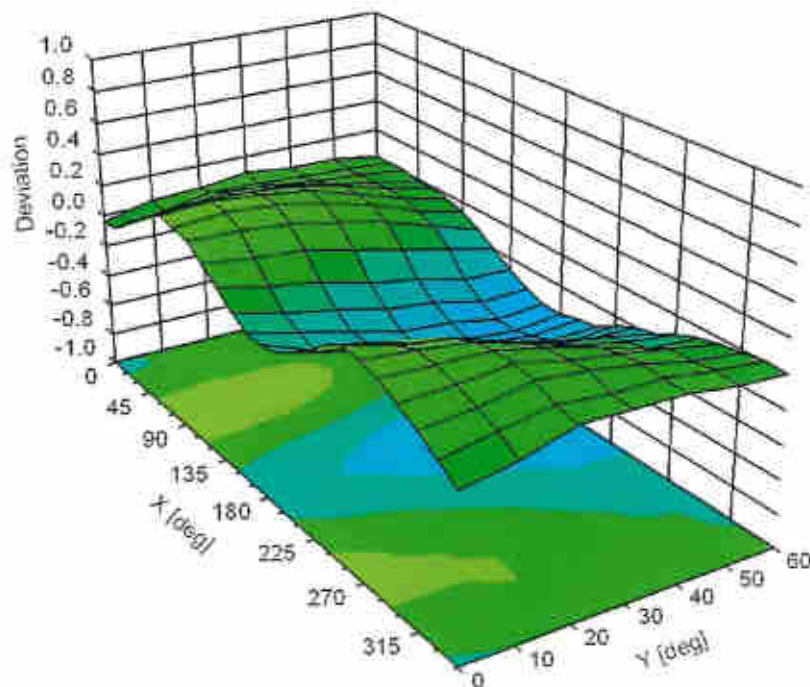


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment



Deviation from Isotropy in Liquid Error (ϕ, θ), f = 900 MHz





Appendix E. Conducted RF Output Power Table

The detailed power table are shown as follows.



Full Power Mode

GSM900 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	835.4	848.8	32.50	22.63	22.77	22.62	23.50
GSM 1 Tx slot	31.63	31.77	31.62	32.50	22.63	22.77	22.62	23.50
GPRS 1 Tx slot	31.62	31.75	31.59	32.50	22.62	22.75	22.59	23.50
GPRS 2 Tx slots	29.73	29.88	29.75	30.50	23.73	23.88	23.75	24.50
GPRS 3 Tx slots	28.11	28.31	28.17	29.00	23.85	24.05	23.91	24.74
GPRS 4 Tx slots	27.05	27.25	27.12	28.00	24.05	24.25	24.12	25.00
EDGE 1 Tx slot	26.58	26.62	26.69	27.50	17.58	17.52	17.69	18.50
EDGE 2 Tx slots	24.17	24.12	24.31	25.00	18.17	18.12	18.31	19.00
EDGE 3 Tx slots	22.85	22.93	23.03	24.00	18.59	18.67	18.77	19.74
EDGE 4 Tx slots	22.24	22.32	22.47	23.50	19.24	19.32	19.47	20.50

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	1860	1869.8	30.50	13.50.2	13.60	13.69.8	21.50
GSM 1 Tx slot	20.16	20.28	20.31	30.50	20.16	20.28	20.31	21.50
GPRS 1 Tx slot	29.15	29.26	29.29	30.50	20.15	20.26	20.29	21.50
GPRS 2 Tx slots	26.64	26.78	26.86	27.50	20.64	20.78	20.86	21.50
GPRS 3 Tx slots	25.11	25.24	25.30	26.50	20.85	20.98	21.04	22.24
GPRS 4 Tx slots	24.11	24.35	24.34	25.50	21.11	21.35	21.34	22.50
EDGE 1 Tx slot	25.90	26.08	26.07	27.00	16.90	17.08	17.07	18.00
EDGE 2 Tx slots	23.28	23.42	23.45	24.50	17.28	17.42	17.45	18.50
EDGE 3 Tx slots	22.15	22.30	22.33	23.00	17.89	18.04	18.07	18.74
EDGE 4 Tx slots	21.47	21.65	21.67	22.50	18.47	18.65	18.67	19.50

Band TX Channel	WCDMA II			Tune-up Limit (dBm)	WCDMA V			Tune-up Limit (dBm)
	9262	9400	9538		4132	4182	4233	
Frequency (MHz)	962	9800	9938	30.50	4357	4407	4458	23.00
3GPP Rel 99 RMC 12.2kbps	22.42	22.46	22.44	24.00	23.23	23.36	23.31	24.00
3GPP Rel 99 RMC 12.2kbps	22.43	22.48	22.46	24.00	23.24	23.37	23.34	24.00
3GPP Rel 6 HSDPA Subtest-1	21.81	21.79	21.81	23.00	22.39	22.43	22.38	23.00
3GPP Rel 6 HSDPA Subtest-2	21.76	21.72	21.72	23.00	22.37	22.32	22.41	23.00
3GPP Rel 6 HSDPA Subtest-3	21.22	21.22	21.20	22.50	21.90	21.83	21.99	22.50
3GPP Rel 6 HSDPA Subtest-4	21.23	21.21	21.18	22.50	21.94	21.85	22.01	22.50
3GPP Rel 8 DC-HSDPA Subtest-1	21.52	21.46	21.39	23.00	22.41	22.50	22.32	23.00
3GPP Rel 8 DC-HSDPA Subtest-2	21.89	21.49	21.37	23.00	22.40	22.34	22.41	23.00
3GPP Rel 8 DC-HSDPA Subtest-3	21.25	20.96	20.90	22.50	22.04	22.07	22.14	22.50
3GPP Rel 8 DC-HSDPA Subtest-4	21.22	20.85	20.89	22.50	22.07	21.96	22.09	22.50
3GPP Rel 6 HSUPA Subtest-1	21.85	21.88	21.86	23.00	21.48	21.43	21.54	23.00
3GPP Rel 6 HSUPA Subtest-2	19.83	19.81	19.86	21.00	20.42	20.45	20.51	21.00
3GPP Rel 6 HSUPA Subtest-3	20.85	20.76	20.81	22.00	21.50	21.47	21.57	22.00
3GPP Rel 6 HSUPA Subtest-4	19.44	19.34	19.35	21.00	19.94	19.92	19.95	21.00
3GPP Rel 6 HSUPA Subtest-5	21.70	21.67	21.45	23.00	21.52	21.42	21.52	23.00
3GPP Rel 7 HSPA+ (16QAM) Subtest-1	20.82	20.93	20.81	22.00	21.61	21.70	21.66	23.00



Band 4 (AWS Band) Part 27L (only on channel required)									
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				2050	2075	2050			
Frequency (MHz)				1720	1732.5	1745			
20	QPSK	1	0	22.49	22.75	22.26			
20	QPSK	1	49	22.74	22.81	22.56	24	0	
20	QPSK	1	99	22.29	22.26	22.25			
20	QPSK	50	0	21.63	21.76	21.66			
20	QPSK	50	24	21.56	21.56	21.52	23	1	
20	QPSK	50	50	21.74	21.48	21.51			
20	QPSK	100	0	21.69	21.76	21.60			
20	16QAM	1	0	21.72	21.70	21.60			
20	16QAM	1	49	21.88	21.90	21.95	23	1	
20	16QAM	1	99	21.52	21.47	21.58			
20	16QAM	50	0	20.63	20.51	20.64			
20	16QAM	50	24	20.64	20.54	20.50			
20	16QAM	50	50	20.71	20.45	20.48	22	2	
20	16QAM	100	0	20.71	20.47	20.55			
20	84QAM	1	0	20.60	20.44	20.41			
20	84QAM	1	49	20.89	20.79	20.62	22	2	
20	84QAM	1	99	20.44	20.85	20.40			
20	84QAM	50	0	19.73	20.06	19.68			
20	84QAM	50	24	19.69	20.06	19.60			
20	84QAM	50	50	19.80	20.03	19.63	21	3	
20	84QAM	100	0	19.76	20.05	19.65			
Channel				20025	20175	20325			
Frequency (MHz)				1717.5	1732.5	1747.5			
15	QPSK	1	0	22.46	22.32	22.21			
15	QPSK	1	37	22.67	22.36	22.49	24	0	
15	QPSK	1	74	22.22	22.21	22.18			
15	QPSK	36	0	21.60	21.44	21.59			
15	QPSK	36	20	21.59	21.53	21.47	23	1	
15	QPSK	36	39	21.71	21.41	21.44			
15	QPSK	75	0	21.62	21.44	21.57			
15	16QAM	1	0	21.67	21.63	21.53			
15	16QAM	1	37	21.85	21.87	21.90	23	1	
15	16QAM	1	74	21.45	21.40	21.51			
15	16QAM	36	0	20.60	20.46	20.59			
15	16QAM	36	20	20.57	20.47	20.47	22	2	
15	16QAM	36	39	20.68	20.42	20.41			
15	16QAM	75	0	20.64	20.42	20.50			
15	84QAM	1	0	20.35	20.37	20.34			
15	84QAM	1	37	20.82	20.76	20.59	22	2	
15	84QAM	1	74	20.41	20.80	20.33			
15	84QAM	36	0	18.66	18.99	18.65			
15	84QAM	36	20	19.64	20.03	19.55			
15	84QAM	36	39	19.73	19.96	19.55	21	3	
15	84QAM	75	0	19.73	20.00	19.62			
Channel				20000	20175	20350			
Frequency (MHz)				1715	1732.5	1750			
10	QPSK	1	0	22.43	22.27	22.16			
10	QPSK	1	25	22.60	22.55	22.42	24	0	
10	QPSK	1	49	22.15	22.16	22.11			
10	QPSK	25	0	21.57	21.37	21.52			
10	QPSK	25	12	21.52	21.50	21.42	23	1	
10	QPSK	25	25	21.68	21.34	21.37			
10	QPSK	50	0	21.55	21.39	21.54			
10	16QAM	1	0	21.62	21.56	21.46			
10	16QAM	1	25	21.82	21.84	21.85	23	1	
10	16QAM	1	49	21.38	21.46	21.44			
10	16QAM	25	0	20.37	20.41	20.54			
10	16QAM	25	12	20.50	20.40	20.44			
10	16QAM	25	25	20.65	20.39	20.34	22	2	
10	16QAM	50	0	20.57	20.37	20.45			
10	84QAM	1	0	20.50	20.30	20.27			
10	84QAM	1	25	20.75	20.73	20.56	22	2	
10	84QAM	1	49	20.38	20.75	20.28			
10	84QAM	25	0	19.59	19.82	19.52			
10	84QAM	25	12	19.59	20.00	19.70			
10	84QAM	25	25	19.66	19.89	19.66	21	3	
10	84QAM	50	0	19.70	19.85	19.59			
Channel				19975	20175	20375			
Frequency (MHz)				1712.5	1732.5	1752.5			
5	QPSK	1	0	22.40	22.56	22.55			
5	QPSK	1	12	22.63	22.62	22.85	24	0	
5	QPSK	1	24	22.56	22.56	22.67			
5	QPSK	12	0	21.54	21.30	21.45			
5	QPSK	12	7	21.45	21.47	21.37	23	1	
5	QPSK	12	13	21.65	21.27	21.30			
5	QPSK	25	0	21.48	21.34	21.51			
5	16QAM	1	0	21.37	21.49	21.39			
5	16QAM	1	12	21.79	21.81	21.80	23	1	
5	16QAM	1	24	21.31	21.39	21.37			
5	16QAM	12	0	20.54	20.36	20.49			
5	16QAM	12	7	20.43	20.33	20.41	22	2	
5	16QAM	12	13	20.62	20.36	20.27			
5	16QAM	25	0	20.50	20.32	20.40			
5	84QAM	1	0	20.45	20.23	20.20			
5	84QAM	1	12	20.68	20.70	20.53	22	2	
5	84QAM	1	24	20.35	20.70	20.35			
5	84QAM	12	0	19.52	19.85	19.59			
5	84QAM	12	7	19.54	19.97	19.65	21	3	
5	84QAM	12	13	19.59	19.82	19.59			
5	84QAM	25	0	19.67	19.90	19.56			
Channel				19965	20175	20385			
Frequency (MHz)				1711.5	1732.5	1753.5			
3	QPSK	1	0	22.37	22.55	22.56			
3	QPSK	1	8	22.46	22.49	22.28	24	0	
3	QPSK	1	14	22.44	22.43	22.43			
3	QPSK	8	0	21.51	21.23	21.38			
3	QPSK	8	4	21.38	21.44	21.32	23	1	
3	QPSK	8	7	21.62	21.20	21.23			
3	QPSK	15	0	21.41	21.29	21.48			
3	16QAM	1	0	21.52	21.42	21.43			
3	16QAM	1	8	21.76	21.78	21.75	23	1	
3	16QAM	1	14	21.39	21.32	21.44			
3	16QAM	8	0	20.51	20.31	20.44			
3	16QAM	8	4	20.36	20.26	20.38	22	2	
3	16QAM	8	7	20.59	20.33	20.20			
3	16QAM	15	0	20.43	20.27	20.35			
3	84QAM	1	0	20.40	20.16	20.26			
3	84QAM	1	8	20.61	20.43	20.50	22	2	
3	84QAM	1	14	20.32	20.35	20.28			
3	84QAM	8	0	19.45	19.78	19.56			
3	84QAM	8	4	19.49	19.94	19.60	21	3	
3	84QAM	8	7	19.52	19.75	19.52			
3	84QAM	15	0	19.64	19.85	19.53			
Channel				19957	20175	20393			
Frequency (MHz)				1710.7	1732.5	1754.3			
1.4	QPSK	1	0	22.34	22.12	22.09			
1.4	QPSK	1	3	22.39	22.46	22.21	24	0	
1.4	QPSK	1	5	22.03	22.01	22.06			
1.4	QPSK	3	0	22.46	22.14	22.29			
1.4	QPSK	3	1	22.29	22.39	22.25			
1.4	QPSK	3	3	22.57	22.11	22.14			
1.4	QPSK	6	0	21.34	21.24	21.45	23	1	
1.4	16QAM	1	0	21.47	21.35	21.36			
1.4	16QAM	1	3	21.73	21.75	21.70	23	1	
1.4	16QAM	1	5	21.32	21.25	21.37			
1.4	16QAM	3	0	21.46	21.24	21.37			
1.4	16QAM	3	1	21.27	21.17	21.33			
1.4	16QAM	3	3	21.54	21.28	21.11			
1.4	16QAM	6	0	20.36	20.22	20.30	22	2	
1.4	84QAM	1	0	20.35	20.16	20.19			
1.4	84QAM	1	3	20.54	20.40	20.47			
1.4	84QAM	1	5	20.29	20.60	20.21	22	2	
1.4	84QAM	3	0	20.47	20.69	20.51			
1.4	84QAM	3	1	20.42	20.69	20.53			
1.4	84QAM	3	3	20.43	20.66	20.43	21	3	
1.4	84QAM	6	0	19.81	19.80	19.90			

Band 7 (2600MHz Band) Part 27L									
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)	



Reduced Power Mode for Receive on

GSM900 TX Channel	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	133	169	251		126	169	251	
Frequency (MHz)	824.2	836.4	848.8		824.2	836.4	848.8	
GSM 1 Tx slot	27.78	27.75	27.73	28.50	18.78	18.75	18.73	19.50
GPRS 1 Tx slot	27.77	27.76	27.72	28.50	18.77	18.76	18.72	19.50
GPRS 2 Tx slots	25.65	25.63	25.62	26.50	19.65	19.63	19.62	20.50
GPRS 3 Tx slots	23.88	23.87	23.88	25.00	19.62	19.61	19.62	20.74
GPRS 4 Tx slots	22.89	22.82	22.84	24.00	19.89	19.82	19.84	21.00
EDGE 1 Tx slot	26.76	26.74	26.75	27.50	17.76	17.74	17.75	18.50
EDGE 2 Tx slots	24.25	24.28	24.32	25.00	18.25	18.28	18.32	19.00
EDGE 3 Tx slots	23.16	23.17	23.33	24.00	18.90	18.91	19.07	19.74
EDGE 4 Tx slots	22.35	22.35	22.43	23.50	19.35	19.35	19.43	20.50

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	1860	1869.8		1850.2	1860	1869.8	
GSM 1 Tx slot	23.42	23.27	23.50	24.50	14.42	14.27	14.59	15.50
GPRS 1 Tx slot	23.41	23.26	23.60	24.50	14.41	14.26	14.60	15.50
GPRS 2 Tx slots	21.22	21.06	21.39	22.50	15.22	15.06	15.39	16.50
GPRS 3 Tx slots	19.52	19.33	19.50	20.50	15.26	15.07	15.24	16.24
GPRS 4 Tx slots	18.47	18.50	18.44	20.00	15.47	15.50	15.44	17.00
EDGE 1 Tx slot	20.15	20.23	20.27	21.50	11.15	11.23	11.27	12.50
EDGE 2 Tx slots	19.43	19.56	19.53	20.50	13.43	13.56	13.53	14.50
EDGE 3 Tx slots	19.34	19.43	19.42	20.50	15.08	15.17	15.16	16.24
EDGE 4 Tx slots	18.59	18.75	18.71	18.00	15.59	15.75	15.71	15.00

Band	TX Channel	WCDMA II			Tune-up Limit (dBm)	WCDMA V			Tune-up Limit (dBm)
		9262	9400	9538		4132	4182	4233	
	Frequency (MHz)	962	9800	9938		4367	4407	4458	
	Frequency (MHz)	1852.4	1860	1867.8		2624	2664	2684	
3GPP Rel 99	AMR 12.2kbps	12.61	12.45	12.41	14.00	19.03	19.00	19.01	20.00
3GPP Rel 99	AMR 12.2kbps	12.47	12.63	12.42	14.00	19.05	19.08	19.03	20.00
3GPP Rel 6	HSDPA Subtest-1	11.31	11.44	11.38	12.50	17.73	17.73	17.70	18.50
3GPP Rel 6	HSDPA Subtest-2	11.20	11.28	11.04	12.50	17.68	17.64	17.63	18.50
3GPP Rel 6	HSDPA Subtest-3	10.73	10.79	10.82	12.00	17.18	17.13	17.15	18.00
3GPP Rel 6	HSDPA Subtest-4	10.64	10.75	10.84	12.00	17.14	17.10	17.12	18.00
3GPP Rel 6	DC-HSDPA Subtest-1	11.32	11.42	11.37	12.50	17.71	17.72	17.68	18.50
3GPP Rel 6	DC-HSDPA Subtest-2	11.21	11.27	11.03	12.50	17.66	17.62	17.62	18.50
3GPP Rel 6	DC-HSDPA Subtest-3	10.72	10.78	10.81	12.00	17.19	17.11	17.13	18.00
3GPP Rel 6	DC-HSDPA Subtest-4	10.62	10.74	10.82	12.00	17.13	17.09	17.11	18.00
3GPP Rel 6	HSUPA Subtest-1	11.32	11.42	11.36	12.50	17.70	17.72	17.65	18.50
3GPP Rel 6	HSUPA Subtest-2	9.36	9.45	9.29	10.50	15.62	15.65	15.64	16.50
3GPP Rel 6	HSUPA Subtest-3	10.56	10.58	10.82	11.50	16.58	16.61	16.63	17.50
3GPP Rel 6	HSUPA Subtest-4	9.41	9.71	9.73	10.50	15.33	15.35	15.39	16.50
3GPP Rel 6	HSUPA Subtest-5	11.31	11.28	11.35	12.50	17.65	17.66	17.66	18.50
3GPP Rel 7	HSPA+ (16QAM) Subtest-1	11.30	11.42	11.35	12.50	17.73	17.74	17.68	18.50



Band 4 (AWS Band) Part 27L (only on channel required)											
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				20650	20175	20300					
Frequency (MHz)				1720	1732.5	1745					
20	QPSK	1	0	14.00	14.16	14.04					
20	QPSK	1	49	14.14	14.01	14.00	15	0			
20	QPSK	1	99	13.89	13.77	13.88					
20	QPSK	50	0	14.12	14.13	13.77					
20	QPSK	50	24	14.09	14.00	13.97					
20	QPSK	50	50	13.77	14.01	13.92	15	0			
20	QPSK	100	0	13.84	14.09	14.07					
20	16QAM	1	0	13.78	14.12	13.93					
20	16QAM	1	49	14.01	13.89	13.88	15	0			
20	16QAM	1	99	14.02	14.00	14.00					
20	16QAM	50	0	14.11	13.94	13.78					
20	16QAM	50	24	14.09	13.97	13.99					
20	16QAM	50	50	13.78	13.98	13.92	15	0			
20	16QAM	100	0	13.76	13.82	14.09					
20	64QAM	1	0	14.02	13.97	13.79					
20	64QAM	1	49	14.02	13.87	13.88	15	0			
20	64QAM	1	99	13.77	13.69	13.76					
20	64QAM	50	0	14.10	13.93	13.88					
20	64QAM	50	24	14.08	13.95	13.95					
20	64QAM	50	50	13.87	14.00	13.91	15	0			
20	64QAM	100	0	13.87	13.82	14.11					
Channel				20305	20175	20305	Tune-up limit (dBm)	MPR (dB)			
Frequency (MHz)				1717.5	1732.5	1747.5					
15	QPSK	1	0	14.08	13.97	13.86					
15	QPSK	1	37	13.89	14.08	14.11	15	0			
15	QPSK	1	74	13.86	13.77	13.75					
15	QPSK	36	0	14.11	14.00	14.03					
15	QPSK	36	20	14.11	13.97	13.94					
15	QPSK	36	39	14.08	13.79	13.94	15	0			
15	QPSK	75	0	14.13	13.91	13.98					
15	16QAM	1	0	14.01	13.89	14.08					
15	16QAM	1	37	14.00	14.02	14.02	15	0			
15	16QAM	1	74	14.14	14.00	14.10					
15	16QAM	36	0	13.84	14.00	14.02					
15	16QAM	36	20	14.11	13.96	13.97					
15	16QAM	36	39	14.10	13.90	13.96	15	0			
15	16QAM	75	0	14.13	13.88	13.96					
15	64QAM	1	0	13.87	14.10	13.94					
15	64QAM	1	37	14.03	13.82	13.88	15	0			
15	64QAM	1	74	14.01	13.85	13.98					
15	64QAM	36	0	14.11	13.97	14.04					
15	64QAM	36	20	14.09	13.96	13.96					
15	64QAM	36	39	14.08	13.79	13.94	15	0			
15	64QAM	75	0	14.10	13.88	13.99					
Channel				20600	20175	20350	Tune-up limit (dBm)	MPR (dB)			
Frequency (MHz)				1715	1732.5	1750					
10	QPSK	1	0	14.14	13.99	13.92					
10	QPSK	1	25	13.89	14.11	14.04	15	0			
10	QPSK	1	49	14.00	13.87	13.85					
10	QPSK	25	0	13.87	14.05	14.01					
10	QPSK	25	12	13.78	14.03	14.01					
10	QPSK	25	25	14.13	13.87	14.00	15	0			
10	QPSK	50	0	13.89	13.97	14.03					
10	16QAM	1	0	13.98	13.85	13.88					
10	16QAM	1	25	14.00	13.89	14.02	15	0			
10	16QAM	1	49	14.02	14.11	13.98					
10	16QAM	25	0	13.89	14.02	14.03					
10	16QAM	25	12	13.88	14.00	14.04					
10	16QAM	25	25	14.13	13.87	14.02	15	0			
10	16QAM	50	0	13.87	13.95	14.05					
10	64QAM	1	0	13.89	14.13	14.06					
10	64QAM	1	25	14.02	13.87	13.89	15	0			
10	64QAM	1	49	13.76	13.97	14.06					
10	64QAM	25	0	13.82	14.01	14.01					
10	64QAM	25	12	13.81	14.01	14.02	15	0			
10	64QAM	25	25	14.13	13.86	13.99					
10	64QAM	50	0	13.78	13.94	14.03					
Channel				19975	20175	20315	Tune-up limit (dBm)	MPR (dB)			
Frequency (MHz)				1712.5	1732.5	1752.5					
5	QPSK	1	0	14.02	13.87	13.84					
5	QPSK	1	12	13.89	14.07	14.04	15	0			
5	QPSK	1	24	13.96	13.79	13.76					
5	QPSK	12	0	14.10	13.96	13.87					
5	QPSK	12	7	14.12	13.97	13.98					
5	QPSK	12	13	14.05	13.86	13.89	15	0			
5	QPSK	25	0	14.08	13.95	13.91					
5	16QAM	1	0	13.98	14.10	13.87					
5	16QAM	1	12	13.89	14.02	14.02	15	0			
5	16QAM	1	24	13.88	14.02	13.77					
5	16QAM	12	0	14.12	13.98	13.94					
5	16QAM	12	7	14.13	13.97	13.98					
5	16QAM	12	13	14.07	13.87	13.91	15	0			
5	16QAM	25	0	14.08	13.90	13.90					
5	64QAM	1	0	13.76	14.02	14.02					
5	64QAM	1	12	14.02	13.89	13.87	15	0			
5	64QAM	1	24	14.12	13.91	13.98					
5	64QAM	12	0	14.11	13.92	13.89					
5	64QAM	12	7	14.12	13.96	13.94					
5	64QAM	12	13	14.03	13.85	13.90	15	0			
5	64QAM	25	0	14.07	13.90	13.90					
Channel				19985	20175	20385	Tune-up limit (dBm)	MPR (dB)			
Frequency (MHz)				1711.5	1732.5	1753.5					
3	QPSK	1	0	14.09	13.94	13.93					
3	QPSK	1	6	14.09	13.89	13.90	15	0			
3	QPSK	1	14	14.05	13.87	13.88					
3	QPSK	6	0	14.11	13.96	13.94					
3	QPSK	6	4	14.15	13.97	13.96					
3	QPSK	6	7	14.10	13.94	13.91	15	0			
3	QPSK	15	0	14.10	13.94	13.90					
3	16QAM	1	0	14.02	13.87	13.89					
3	16QAM	1	6	14.02	14.14	13.87	15	0			
3	16QAM	1	14	14.01	13.87	13.87					
3	16QAM	6	0	14.15	13.98	13.98					
3	16QAM	6	4	14.15	13.96	14.00	15	0			
3	16QAM	6	7	14.14	13.96	13.98					
3	16QAM	15	0	14.09	13.90	13.92					
3	64QAM	1	0	13.92	14.06	14.07					
3	64QAM	1	6	13.89	14.06	14.03	15	0			
3	64QAM	1	14	13.87	14.03	14.04					
3	64QAM	6	0	14.12	13.95	13.94					
3	64QAM	6	4	14.13	13.93	13.94					
3	64QAM	6	7	14.09	13.90	13.94	15	0			
3	64QAM	15	0	14.08	13.90	13.91					
Channel				19977	20175	20333	Tune-up limit (dBm)	MPR (dB)			
Frequency (MHz)				1710.7	1732.5	1754.3					
1.4	QPSK	1	0	14.05	13.89	13.88					
1.4	QPSK	1	3	13.88	14.05	13.99					
1.4	QPSK	1	5	14.05	13.89	13.86	15	0			
1.4	QPSK	3	0	14.14	13.96	13.96					
1.4	QPSK	3	1	13.88	14.03	14.00					
1.4	QPSK	3	3	14.14	13.97	13.96					
1.4	QPSK	6	0	13.82	13.96	13.93	15	0			
1.4	16QAM	1	0	13.88	14.12	14.15					
1.4	16QAM	1	3	13.89	13.88	13.82					
1.4	16QAM	1	5	13.98	13.86	13.87					
1.4	16QAM	3	0	14.13	13.96	14.04	15	0			
1.4	16QAM	3	1	13.89	14.05	14.05					
1.4	16QAM	3	3	13.84	13.98	14.01					
1.4	16QAM	6	0	13.78	14.01	14.04	15	0			
1.4	64QAM	1	0	13.89	14.03	14.09					
1.4	64QAM	1	3	14.02	14.15	13.87					
1.4	64QAM	1	5	13.87	14.03	14.02					
1.4	64QAM	3	0	13.89	14.04	14.05	15	0			
1.4	64QAM	3	1	13.88	14.10	14.10					
1.4	64QAM	3	3	13.78	13.98	14.04					
1.4	64QAM	6	0	13.87	13.97	13.98	15	0			

Band 7 (3500MHz Band) Part 27											
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				20650	21100	21350					
Frequency (MHz)				2510	2535	2560					
20	QPSK	1	0	12.04	12.10	12.03					
20	QPSK	1	49	11.98	11.94	11.93	13.5	0			
20	QPSK	1	99	11.88	11.87	11.88					
20	QPSK	50	0								



Reduced Power Mode for P-Sensor on

GSM900 TX Channel Frequency (MHz)	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	128	160	251		128	160	251	
	824.2	836.4	848.8	24.50	824.2	836.4	848.8	15.50
GSM 1 Tx slot	24.15	24.42	24.23	24.50	15.15	15.42	15.23	15.50
GPRS 1 Tx slot	24.13	24.40	24.21	24.50	15.13	15.40	15.21	15.50
GPRS 2 Tx slots	24.10	24.39	24.20	24.50	15.10	18.39	18.20	18.50
GPRS 3 Tx slots	23.46	23.73	23.59	24.50	14.46	19.47	19.33	20.24
GPRS 4 Tx slots	23.71	23.43	23.57	24.50	14.71	20.43	20.57	21.50
EDGE 1 Tx slot	22.43	22.51	22.78	23.50	13.43	13.51	13.78	14.50
EDGE 2 Tx slots	21.75	21.74	22.16	23.50	12.75	15.74	16.16	17.50
EDGE 3 Tx slots	21.63	21.64	22.04	23.50	12.63	17.38	17.78	19.24
EDGE 4 Tx slots	21.53	21.56	21.82	23.50	12.53	18.56	18.82	20.50

GSM1900 TX Channel Frequency (MHz)	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	512	661	810		512	661	810	
	1850.2	1850	1869.8	19.50	1850.2	1850	1869.8	10.50
GSM 1 Tx slot	18.75	19.13	19.19	19.50	9.75	10.13	10.19	10.50
GPRS 1 Tx slot	18.73	19.10	19.17	19.50	9.73	10.10	10.17	10.50
GPRS 2 Tx slots	18.52	18.85	18.91	19.50	12.52	12.85	12.91	13.50
GPRS 3 Tx slots	18.55	18.87	18.94	19.00	14.29	14.61	14.68	14.74
GPRS 4 Tx slots	17.96	18.29	18.19	19.00	14.96	15.29	15.19	16.00
EDGE 1 Tx slot	14.86	14.74	14.86	15.50	5.86	5.74	5.86	6.50
EDGE 2 Tx slots	14.43	14.43	14.45	15.50	8.43	8.43	8.45	11.50
EDGE 3 Tx slots	14.39	14.35	14.37	15.50	10.13	10.09	10.11	11.24
EDGE 4 Tx slots	14.07	14.12	14.12	15.50	11.07	11.12	11.12	12.50

Band TX Channel Frequency (MHz)	WCDMA II			Tune-up Limit (dBm)	WCDMA V			Tune-up Limit (dBm)
	9262	9400	9538		4132	4182	4233	
	962	9800	9938	16.00	4357	4407	4458	17.50
3GPP Rel 99	15.38	15.40	15.37	16.00	16.80	16.81	16.67	17.50
3GPP Rel 99	RMC 12.2kbps	15.39	15.41	15.38	16.00	16.81	16.82	16.69
3GPP Rel 6	HSDPA Subtest-1	14.37	14.43	14.42	15.00	15.51	15.41	15.37
3GPP Rel 6	HSDPA Subtest-2	14.34	14.31	14.36	15.00	15.46	15.39	15.32
3GPP Rel 6	HSDPA Subtest-3	13.81	13.90	13.81	14.50	14.95	14.91	14.80
3GPP Rel 6	HSDPA Subtest-4	13.73	13.86	13.84	14.50	14.96	14.89	14.83
3GPP Rel 6	DC-HSDPA Subtest-1	14.34	14.40	14.39	15.00	15.49	15.37	15.34
3GPP Rel 6	DC-HSDPA Subtest-2	14.31	14.28	14.33	15.00	15.44	15.35	15.29
3GPP Rel 6	DC-HSDPA Subtest-3	13.78	13.87	13.78	14.50	14.93	14.87	14.77
3GPP Rel 6	DC-HSDPA Subtest-4	13.70	13.83	13.81	14.50	14.94	14.85	14.80
3GPP Rel 6	HSUPA Subtest-1	13.29	13.22	13.21	15.00	15.01	14.92	14.84
3GPP Rel 6	HSUPA Subtest-2	12.82	12.86	12.89	13.00	13.95	13.92	13.83
3GPP Rel 6	HSUPA Subtest-3	13.91	13.91	13.84	14.00	15.07	14.94	14.84
3GPP Rel 6	HSUPA Subtest-4	12.34	12.42	12.38	13.00	13.46	13.54	13.35
3GPP Rel 6	HSUPA Subtest-5	13.80	13.80	13.80	15.00	15.00	14.90	14.70
3GPP Rel 7	HSPA+ (16QAM) Subtest-1	13.76	13.77	13.67	15.00	14.96	14.81	14.69



Band 4 (AWS Band)												
Part 27L (only on channel required)												
BW (MHz)	Modulation	RB Size	RB Offset	Power			Tune-up limit (dBm)	MPR (dB)				
				Low Ch. Freq.	Middle Ch. Freq.	High Ch. Freq.			Low Ch. Freq.	Middle Ch. Freq.	High Ch. Freq.	
Channel				20250	20175	20300			Channel			
Frequency (MHz)				1720	1732.5	1745			Channel			
20	QPSK	1	0	13.79	14.09	13.98	15	0	Channel			
20	QPSK	1	49	13.88	13.76	13.67			Frequency (MHz)			
20	QPSK	1	99	13.77	13.67	13.76			Channel			
20	QPSK	50	0	13.86	13.89	13.89	15	0	Channel			
20	QPSK	50	24	13.82	13.74	13.67			Frequency (MHz)			
20	QPSK	50	50	13.84	13.62	13.64			Channel			
20	QPSK	100	0	13.89	13.90	13.77	15	0	Channel			
20	16QAM	1	0	13.88	13.97	13.83			Frequency (MHz)			
20	16QAM	1	49	13.77	13.78	13.89			Channel			
20	16QAM	1	99	13.75	13.67	13.59	15	0	Channel			
20	16QAM	50	0	13.90	13.83	13.98			Frequency (MHz)			
20	16QAM	50	24	13.85	13.76	13.72			Channel			
20	16QAM	50	50	13.88	13.63	13.68	15	0	Channel			
20	16QAM	100	0	13.89	13.74	13.80			Frequency (MHz)			
20	64QAM	1	0	13.86	13.77	13.71			Channel			
20	64QAM	1	49	14.00	13.97	13.89	15	0	Channel			
20	64QAM	1	99	13.59	13.53	13.65			Frequency (MHz)			
20	64QAM	50	0	13.87	13.81	13.67			Channel			
20	64QAM	50	24	13.84	13.74	13.70	15	0	Channel			
20	64QAM	50	50	13.85	13.63	13.65			Frequency (MHz)			
20	64QAM	100	0	13.89	13.74	13.79			Channel			
Channel				20925	20176	20325			Channel			
Frequency (MHz)				1717.5	1723.5	1727.5			Channel			
15	QPSK	1	0	13.76	13.73	13.63	15	0	Channel			
15	QPSK	1	37	13.90	13.84	13.75			Frequency (MHz)			
15	QPSK	1	74	13.81	13.52	13.42			Channel			
15	QPSK	36	0	13.81	13.76	13.67	15	0	Channel			
15	QPSK	36	20	13.81	13.70	13.64			Frequency (MHz)			
15	QPSK	36	39	13.79	13.63	13.61			Channel			
15	QPSK	75	0	13.82	13.73	13.65	15	0	Channel			
15	16QAM	1	0	13.78	13.98	13.96			Frequency (MHz)			
15	16QAM	1	37	13.78	13.81	13.78			Channel			
15	16QAM	1	74	13.99	13.89	13.79	15	0	Channel			
15	16QAM	36	0	13.85	13.79	13.74			Frequency (MHz)			
15	16QAM	36	20	13.83	13.77	13.70			Channel			
15	16QAM	36	39	13.84	13.64	13.67	15	0	Channel			
15	16QAM	75	0	13.85	13.73	13.70			Frequency (MHz)			
15	64QAM	1	0	13.98	13.92	13.81			Channel			
15	64QAM	1	37	13.77	14.02	13.96	15	0	Channel			
15	64QAM	1	74	13.84	13.74	13.66			Frequency (MHz)			
15	64QAM	36	0	13.84	13.78	13.74			Channel			
15	64QAM	36	20	13.86	13.75	13.72	15	0	Channel			
15	64QAM	36	39	13.82	13.64	13.65			Frequency (MHz)			
15	64QAM	75	0	13.84	13.72	13.70			Channel			
Channel				20000	20175	20350			Channel			
Frequency (MHz)				1715	1732.5	1750			Channel			
10	QPSK	1	0	13.82	13.75	13.62	15	0	Channel			
10	QPSK	1	25	13.87	13.76	13.71			Frequency (MHz)			
10	QPSK	1	49	13.71	13.60	13.48			Channel			
10	QPSK	25	0	13.81	13.74	13.69	15	0	Channel			
10	QPSK	25	12	13.83	13.72	13.69			Frequency (MHz)			
10	QPSK	25	25	13.77	13.65	13.56			Channel			
10	QPSK	50	0	13.79	13.71	13.67	15	0	Channel			
10	16QAM	1	0	13.78	14.08	13.98			Frequency (MHz)			
10	16QAM	1	25	13.76	13.77	14.00			Channel			
10	16QAM	1	49	14.01	13.93	13.86	15	0	Channel			
10	16QAM	25	0	13.83	13.76	13.73			Frequency (MHz)			
10	16QAM	25	12	13.83	13.76	13.71			Channel			
10	16QAM	25	25	13.83	13.66	13.61	15	0	Channel			
10	16QAM	50	0	13.81	13.73	13.70			Frequency (MHz)			
10	64QAM	1	0	14.07	13.93	13.82			Channel			
10	64QAM	1	25	13.90	13.96	13.99	15	0	Channel			
10	64QAM	1	49	13.92	13.82	13.71			Frequency (MHz)			
10	64QAM	25	0	13.81	13.76	13.70			Channel			
10	64QAM	25	12	13.83	13.76	13.72	15	0	Channel			
10	64QAM	25	25	13.80	13.66	13.57			Frequency (MHz)			
10	64QAM	50	0	13.80	13.70	13.68			Channel			
Channel				19975	20176	20375			Channel			
Frequency (MHz)				1712.5	1722.5	1725.5			Channel			
5	QPSK	1	0	13.72	13.60	13.54	15	0	Channel			
5	QPSK	1	12	13.91	13.85	13.75			Frequency (MHz)			
5	QPSK	1	24	13.60	13.53	13.76			Channel			
5	QPSK	12	0	13.77	13.70	13.65	15	0	Channel			
5	QPSK	12	7	13.81	13.75	13.60			Frequency (MHz)			
5	QPSK	12	13	13.76	13.66	13.54			Channel			
5	QPSK	25	0	13.78	13.69	13.59	15	0	Channel			
5	16QAM	1	0	13.77	13.95	13.92			Frequency (MHz)			
5	16QAM	1	12	13.77	13.81	13.78			Channel			
5	16QAM	1	24	13.96	13.89	13.78	15	0	Channel			
5	16QAM	12	0	13.87	13.76	13.71			Frequency (MHz)			
5	16QAM	12	7	13.88	13.80	13.69			Channel			
5	16QAM	12	13	13.81	13.70	13.64	15	0	Channel			
5	16QAM	25	0	13.81	13.73	13.64			Frequency (MHz)			
5	64QAM	1	0	13.92	13.81	13.74			Channel			
5	64QAM	1	12	14.01	13.99	14.01	15	0	Channel			
5	64QAM	1	24	13.85	13.75	13.67			Frequency (MHz)			
5	64QAM	12	0	13.82	13.73	13.70			Channel			
5	64QAM	12	7	13.86	13.78	13.67	15	0	Channel			
5	64QAM	12	13	13.80	13.67	13.56			Frequency (MHz)			
5	64QAM	25	0	13.82	13.69	13.62			Channel			
Channel				19985	20175	20385			Channel			
Frequency (MHz)				1711.5	1732.5	1753.5			Channel			
3	QPSK	1	0	13.81	13.71	13.63	15	0	Channel			
3	QPSK	1	8	13.76	13.69	13.55			Frequency (MHz)			
3	QPSK	1	14	13.75	13.66	13.53			Channel			
3	QPSK	8	0	13.80	13.74	13.64	15	0	Channel			
3	QPSK	8	4	13.81	13.76	13.63			Frequency (MHz)			
3	QPSK	8	7	13.79	13.72	13.59			Channel			
3	QPSK	15	0	13.77	13.69	13.57	15	0	Channel			
3	16QAM	1	0	13.77	14.03	14.02			Frequency (MHz)			
3	16QAM	1	8	14.02	14.04	13.93			Channel			
3	16QAM	1	14	14.02	14.01	13.87	15	0	Channel			
3	16QAM	8	0	13.89	13.82	13.69			Frequency (MHz)			
3	16QAM	8	4	13.91	13.84	13.73			Channel			
3	16QAM	8	7	13.88	13.79	13.67	15	0	Channel			
3	16QAM	15	0	13.83	13.74	13.61			Frequency (MHz)			
3	64QAM	1	0	13.98	13.92	13.84			Channel			
3	64QAM	1	8	13.98	13.91	13.78	15	0	Channel			
3	64QAM	1	14	13.93	13.87	13.77			Frequency (MHz)			
3	64QAM	8	0	13.84	13.76	13.65			Channel			
3	64QAM	8	4	13.85	13.79	13.65	15	0	Channel			
3	64QAM	8	7	13.85	13.73	13.64			Frequency (MHz)			
3	64QAM	15	0	13.79	13.70	13.61			Channel			
Channel				1957	20175	20393			Channel			
Frequency (MHz)				1710.7	1722.5	1724.3			Channel			
1.4	QPSK	1	0	13.72	13.63	13.51	15	0	Channel			
1.4	QPSK	1	3	13.84	13.75	13.63			Frequency (MHz)			
1.4	QPSK	1	5	13.72	13.62	13.52			Channel			
1.4	QPSK	3	0	13.78	13.70	13.56	15	0	Channel			
1.4	QPSK	3	1	13.83	13.75	13.63			Frequency (MHz)			
1.4	QPSK	3	3	13.80	13.69	13.57			Channel			
1.4	QPSK	6	0	13.90	13.71	13.58	15	0	Channel			
1.4	16QAM	1	0	13.98	13.93	13.89			Frequency (MHz)			
1.4	16QAM	1	3	13.78	13.99	14.00			Channel			
1.4	16QAM	1	5	14.05	13.99	13.86	15	0	Channel			
1.4	16QAM	3	0	13.86	13.77	13.64			Frequency (MHz)			
1.4	16QAM	3	1	13.92	13.82	13.68			Channel			
1.4	16QAM	3	3	13.84	13.76	13.66	15	0	Channel			
1.4	16QAM	6	0	13.92	13.81	13.70			Frequency (MHz)			
1.4	64QAM	1	0	13.96	13.84	13.70			Channel			
1.4	64QAM	1	3	14.05	13.95	13.89	15	0	Channel			
1.4	64QAM	1	5	13.94	13.84	13.64			Frequency (MHz)			
1.4	64QAM	3	0	13.93	13.78	13.67			Channel			
1.4	64QAM	3	1	13.95	13.83	13.72	15	0	Channel			
1.4	64QAM	3	3	13.80	13.8							



2.4GHz WLAN		Ant 1 Full power				
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN	802.11b 1Mbps	1	2412	17.08	18.50	100.00
		6	2437	17.05	18.50	
		11	2462	17.03	18.50	
	802.11g 6Mbps	1	2412	14.79	16.50	97.46
		6	2437	14.98	16.50	
		11	2462	14.80	16.50	
	802.11n-HT20 MCS0	1	2412	14.78	16.50	97.83
		6	2437	14.72	16.50	
		11	2462	14.76	16.50	

2.4GHz WLAN		Ant 1 Receive on				
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN	802.11b 1Mbps	1	2412	15.13	16.50	100.00
		6	2437	14.94	16.50	
		11	2462	15.08	16.50	
	802.11g 6Mbps	1	2412		16.50	97.46
		6	2437		16.50	
		11	2462		16.50	
	802.11n-HT20 MCS0	1	2412		16.50	97.83
		6	2437		16.50	
		11	2462		16.50	

5GHz WLAN		Ant 1 Full power				
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN	802.11a 6Mbps	36	5180	15.32	16.50	97.46
		40	5200	14.96	16.50	
		44	5220	15.29	16.50	
		48	5240	14.83	16.50	
	802.11n-HT20 MCS0	36	5180	15.09	16.50	97.28
		40	5200	15.11	16.50	
		44	5220	15.03	16.50	
	802.11n-HT40 MCS0	38	5190	11.75	13.00	94.49
		46	5230	13.82	15.00	

5GHz WLAN		Ant 1 Receive on				
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN	802.11a 6Mbps	36	5180	10.62	11.50	97.46
		40	5200	10.28	11.50	
		44	5220	10.61	11.50	
		48	5240	10.56	11.50	
	802.11n-HT20 MCS0	36	5180		11.50	97.28
		40	5200		11.50	
		44	5220		11.50	
	802.11n-HT40 MCS0	38	5190		11.50	94.49
		46	5230		11.50	

5GHz WLAN		Ant 1 Full power				
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.3GHz WLAN	802.11a 6Mbps	52	5260	14.82	16.50	97.46
		56	5280	14.76	16.50	
		60	5300	14.79	16.50	
		64	5320	14.67	16.50	
	802.11n-HT20 MCS0	52	5260	14.74	16.50	97.28
		56	5280	14.71	16.50	
		60	5300	14.77	16.50	
	802.11n-HT40 MCS0	64	5320	14.65	16.50	94.49
		54	5270	13.44	15.00	
		62	5310	12.46	14.00	

5GHz WLAN		Ant 1 Receive on				
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.3GHz WLAN	802.11a 6Mbps	52	5260	10.10	11.00	97.46
		56	5280	10.06	11.00	
		60	5300	10.32	11.00	
		64	5320	10.03	11.00	
	802.11n-HT20 MCS0	52	5260		11.00	97.28
		56	5280		11.00	
		60	5300		11.00	
	802.11n-HT40 MCS0	64	5320		11.00	94.49
		54	5270		11.00	
		62	5310		11.00	

5GHz WLAN		Ant 1 Full power				
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.5GHz WLAN	802.11a 6Mbps	100	5500	14.79	15.50	97.46
		116	5580	14.08	15.50	
		124	5620	14.06	15.50	
		132	5660	13.84	15.50	
		140	5700	13.13	14.50	
		144	5720	13.82	14.50	
	802.11n-HT20 MCS0	100	5500	14.65	15.50	97.28
		116	5580	14.50	15.50	
		124	5620	14.11	15.50	
		132	5660	13.70	15.50	
	802.11n-HT40 MCS0	140	5700	13.21	14.50	94.49
		144	5720	13.79	14.50	
		102	5510	12.88	13.50	
		110	5550	13.16	13.50	
		126	5630	12.96	13.50	
		134	5670	12.93	13.50	
		142	5710	12.17	13.50	

5GHz WLAN		Ant 1 Receive on				
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.5GHz WLAN	802.11a 6Mbps	100	5500	11.21	12.50	97.46
		116	5580	11.06	12.50	
		124	5620	11.13	12.50	
		132	5660	10.79	11.50	
		140	5700	10.82	11.50	
		144	5720	10.49	11.50	
	802.11n-HT20 MCS0	100	5500		11.50	97.28
		116	5580		11.50	
		124	5620		11.50	
		132	5660		11.50	
	802.11n-HT40 MCS0	140	5700		11.50	94.49
		144	5720		11.50	
		102	5510		11.50	
		110	5550		11.50	
		126	5630		11.50	
		134	5670		11.50	
		142	5710		11.50	

5GHz WLAN		Ant 1 Full power				
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.8GHz WLAN	802.11a 6Mbps	149	5745	13.98	15.00	97.46
		157	5785	13.68	15.00	
		165	5825	14.30	15.00	
	802.11n-HT20 MCS0	149	5745	13.79	15.00	97.28
		157	5785	13.81	15.00	
		165	5825	13.87	15.00	
	802.11n-HT40 MCS0	151	5755	12.69	13.50	94.49
		159	5795	12.57	13.50	

5GHz WLAN		Ant 1 Receive on				
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.8GHz WLAN	802.11a 6Mbps	149	5745	12.80	13.50	97.46
		157	5785	12.50	13.50	
		165	5825	12.90	13.50	
	802.11n-HT20 MCS0	149	5745		13.50	97.28
		157	5785		13.50	
		165	5825		13.50	
	802.11n-HT40 MCS0	151	5755		13.50	94.49
		159	5795		13.50	

BR / EDR

Mode	Channel	Frequency (MHz)	Average power (dBm)		
			1Mbps	2Mbps	3Mbps
BR / EDR	CH 00	2402	6.93	4.56	5.07
	CH 39	2441	6.92	5.07	4.29
	CH 78	2480	6.80	4.60	5.11
Tune-up Limit			7.5	6	6

LE

Mode	Channel	Frequency (MHz)	Average power (dBm)
			GFSK
LE	CH 00	2402	6.42
	CH 19	2440	6.58
	CH 39	2480	6.50
Tune-up Limit			7.5