

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3279

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	6.58	6.58	6.58	0.80	1.19	± 12.0 %
835	41.5	0.90	6.38	6.38	6.38	0.80	1.21	± 12.0 %
1750	40.1	1.37	5.59	5.59	5.59	0.64	1.37	± 12.0 %
1900	40.0	1.40	5.35	5.35	5.35	0.57	1.45	± 12.0 %
2000	40.0	1.40	5.25	5.25	5.25	0.80	1.22	± 12.0 %
2300	39.5	1.67	5.02	5.02	5.02	0.78	1.30	± 12.0 %
2450	39.2	1.80	4.77	4.77	4.77	0.67	1.44	± 12.0 %
2600	39.0	1.96	4.58	4.58	4.58	0.73	1.39	± 12.0 %

^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.

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3279

Calibration Parameter Determined in Body 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	55.5	0.96	6.40	6.40	6.40	0.68	1.25	± 12.0 %
835	55.2	0.97	6.23	6.23	6.23	0.70	1.22	± 12.0 %
1750	53.4	1.49	5.08	5.08	5.08	0.61	1.42	± 12.0 %
1900	53.3	1.52	4.85	4.85	4.85	0.41	1.84	± 12.0 %
2300	52.9	1.81	4.66	4.66	4.66	0.80	1.24	± 12.0 %
2450	52.7	1.95	4.50	4.50	4.50	0.80	1.25	± 12.0 %
2600	52.5	2.16	4.34	4.34	4.34	0.80	1.25	± 12.0 %

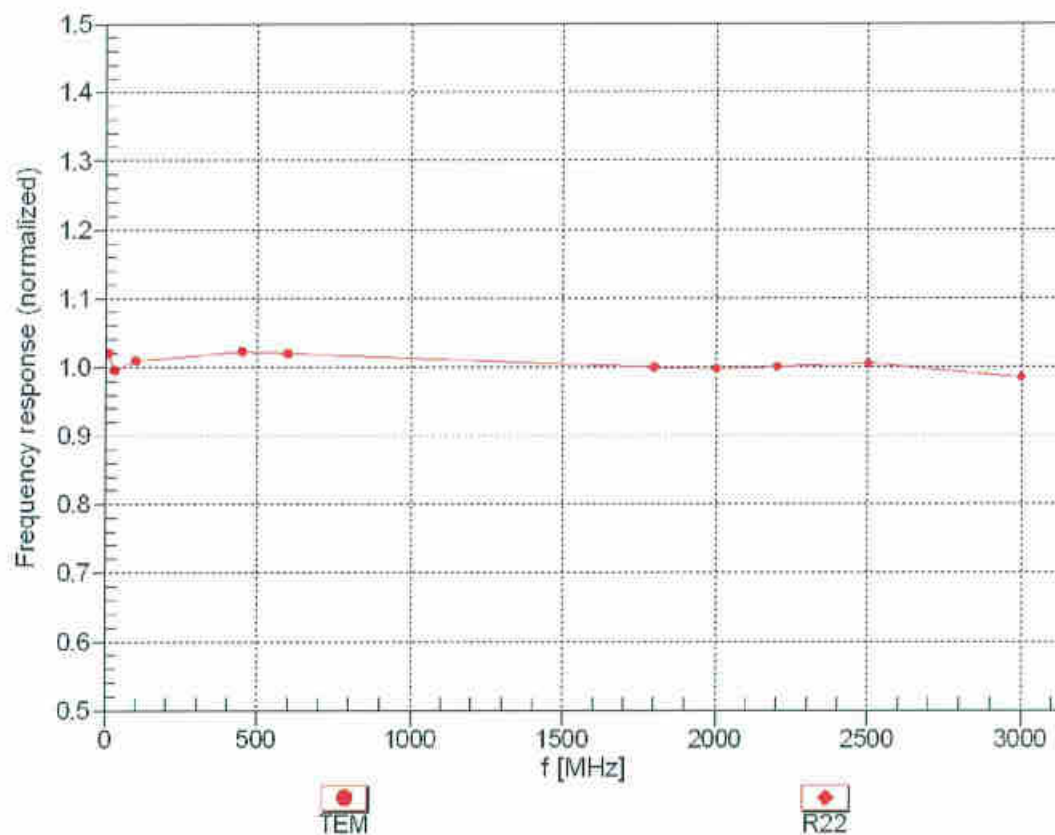
^C Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 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

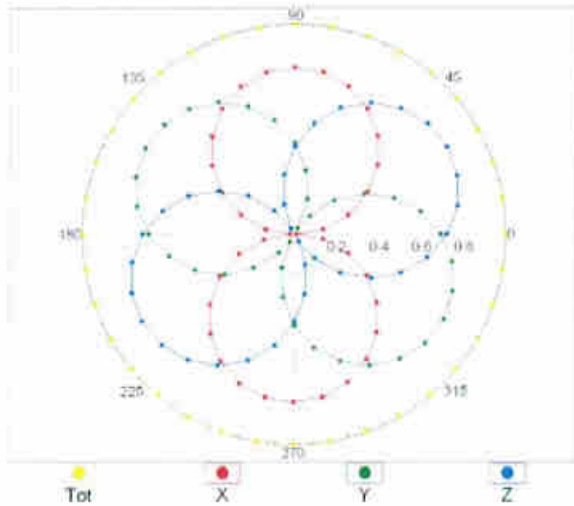
(TEM-Cell:ifi110 EXX, Waveguide: R22)



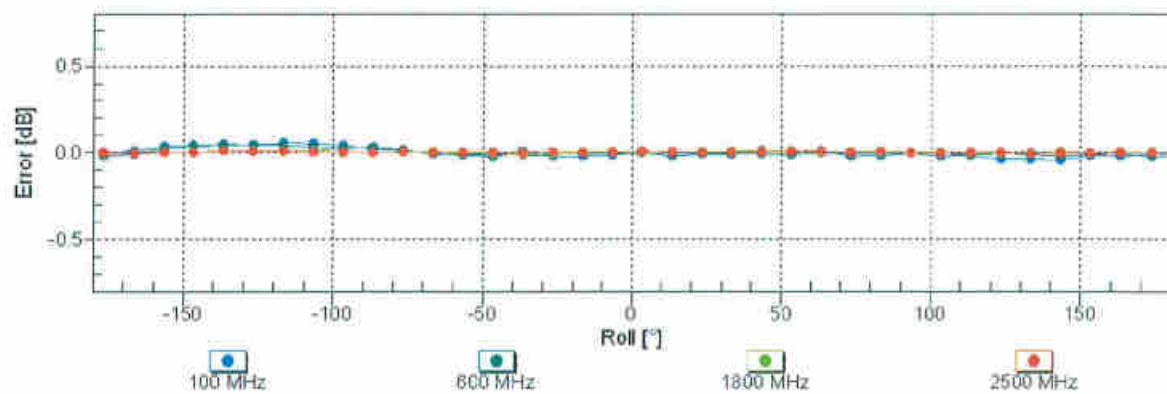
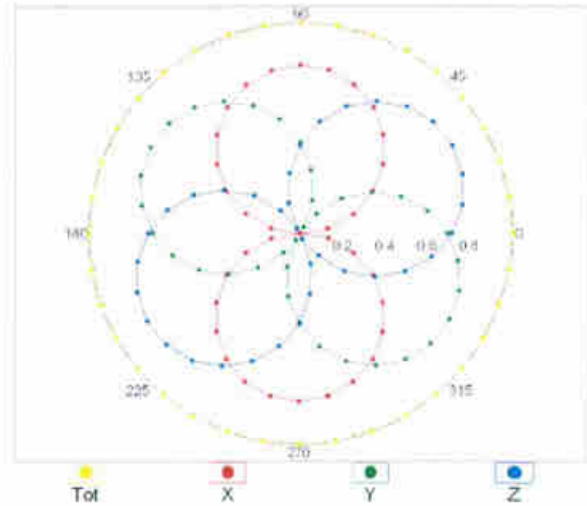
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ ($k=2$)

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

f=600 MHz,TEM

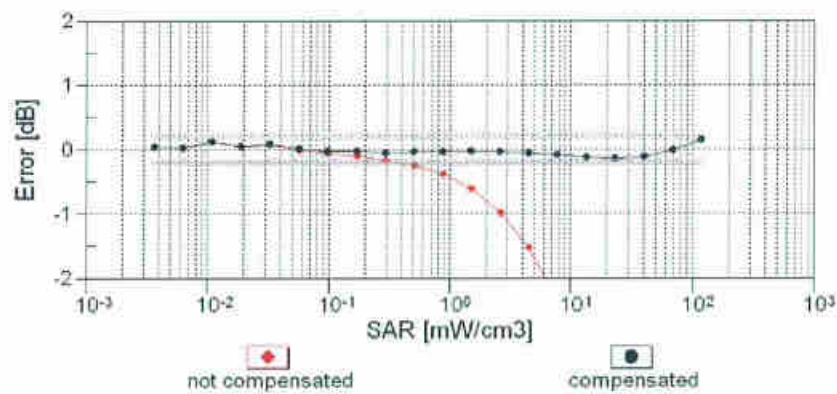
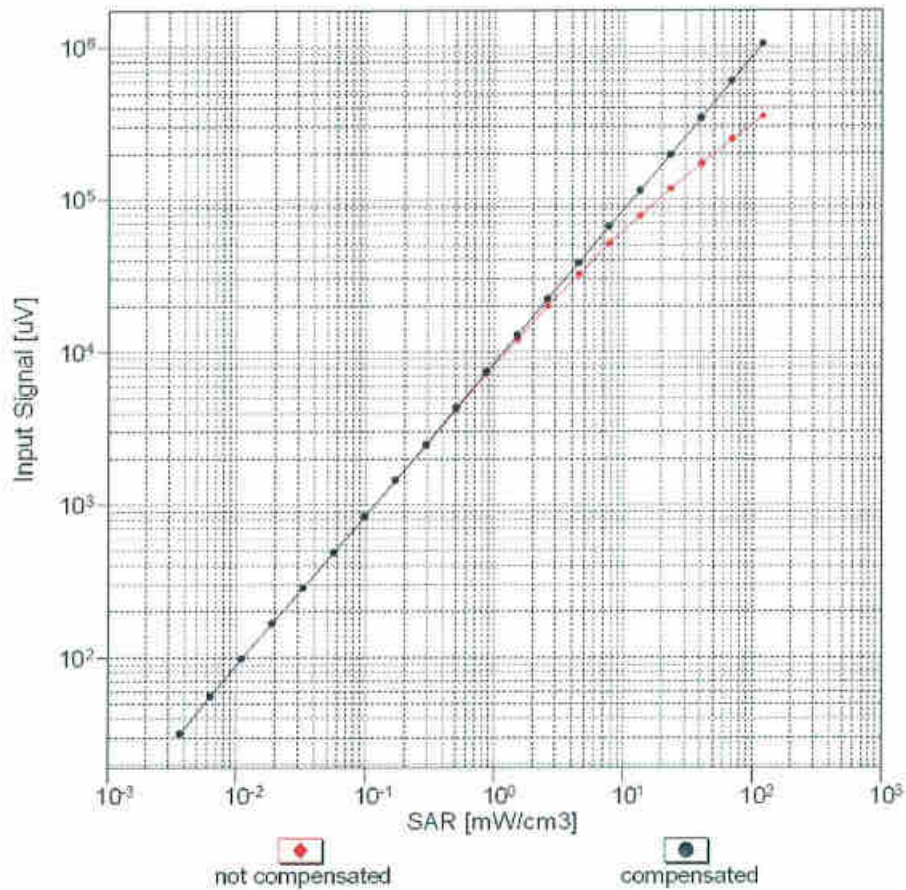


f=1800 MHz,R22



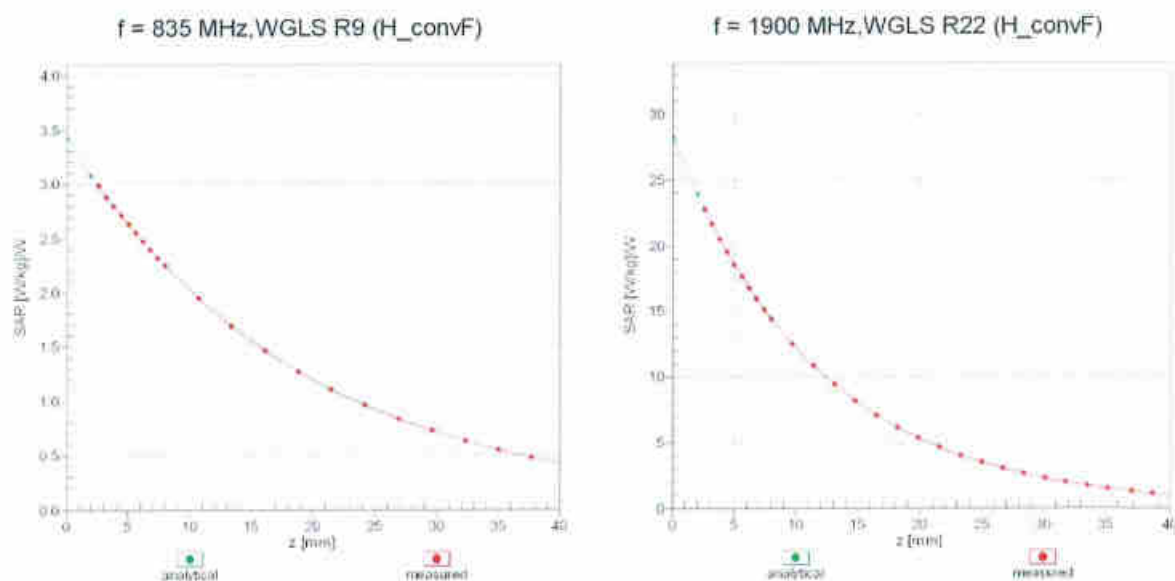
Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

Dynamic Range $f(\text{SAR}_{\text{head}})$ (TEM cell , $f_{\text{eval}} = 1900 \text{ MHz}$)



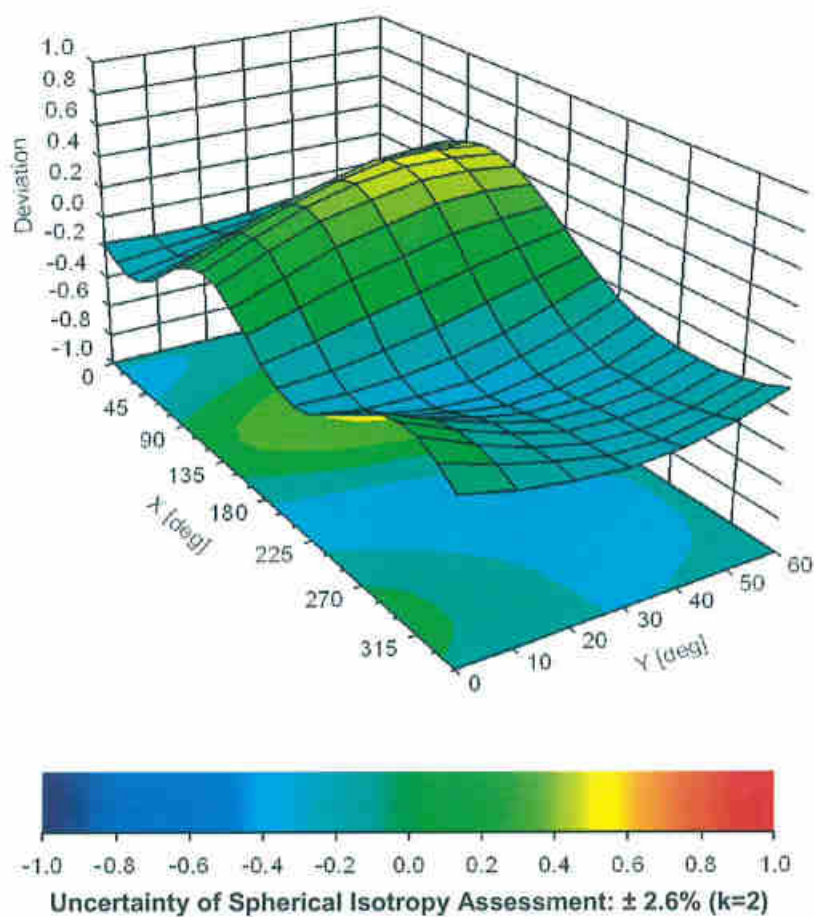
Uncertainty of Linearity Assessment: $\pm 0.6\%$ ($k=2$)

Conversion Factor Assessment



Deviation from Isotropy in Liquid

Error (ϕ, θ), $f = 900 \text{ MHz}$





Appendix E. Conducted RF Output Power Table

The detailed power table are shown as follows.

GSM850		Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
TX Channel	Frequency (MHz)	126	169	251		126	169	251	
		824.2	836.4	848.8		824.2	836.4	848.8	
GSM 1 Tx slot		32.99	32.89	32.96	34.00	23.99	23.89	23.96	25.00
GPRS 1 Tx slot		32.96	32.88	32.94	34.00	23.96	23.88	23.94	25.00
GPRS 2 Tx slots		31.68	31.58	31.65	32.50	25.68	25.58	25.65	26.50
GPRS 3 Tx slots		30.26	30.15	30.22	30.70	26.00	25.89	25.96	26.44
GPRS 4 Tx slots		28.76	28.63	28.67	29.50	25.76	25.63	25.67	26.50
EDGE 1 Tx slot		26.36	26.28	26.31	28.00	17.36	17.28	17.31	19.00
EDGE 2 Tx slots		25.28	25.19	25.21	26.50	19.28	19.19	19.21	20.50
EDGE 3 Tx slots		24.15	24.08	24.08	24.70	19.89	19.82	19.82	20.44
EDGE 4 Tx slots		23.07	23.16	23.01	23.50	20.07	20.16	20.01	20.50

GSM1900		Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
TX Channel	Frequency (MHz)	512	661	810		512	661	810	
		1527.2	1680	1800.8		1527.2	1680	1800.8	
GSM 1 Tx slot		29.53	29.57	29.93	31.00	20.53	20.57	20.93	22.00
GPRS 1 Tx slot		29.48	29.55	29.92	31.00	20.48	20.55	20.92	22.00
GPRS 2 Tx slots		28.07	28.10	28.48	29.50	22.07	22.10	22.48	23.50
GPRS 3 Tx slots		26.58	26.62	27.02	27.70	22.32	22.36	22.76	23.44
GPRS 4 Tx slots		25.05	25.12	25.51	26.50	22.05	22.12	22.51	23.50
EDGE 1 Tx slot		25.95	25.70	25.74	27.00	16.95	16.70	16.74	18.00
EDGE 2 Tx slots		24.10	23.82	23.91	25.50	18.10	17.82	17.91	19.50
EDGE 3 Tx slots		23.21	22.88	23.01	23.70	18.95	18.62	18.75	19.44
EDGE 4 Tx slots		22.25	22.14	22.11	22.50	19.25	19.14	19.11	19.50

Band		WCDMA II			Tune-up Limit (dBm)	WCDMA IV			Tune-up Limit (dBm)	WCDMA V			Tune-up Limit (dBm)
TX Channel		9682	9406	8538		1312	1413	1513		4132	4162	4233	
Rx Channel		9682	9800	9938		1537	1638	1738		4367	4407	4458	
Frequency (MHz)		1852.4	1880	1907.6		1712.4	1732.6	1752.6		828.4	836.4	846.6	
3GPP Rel 99	AMR 12.2Kops	23.31	23.31	23.43	24.50	23.36	23.42	23.45	24.50	24.22	24.29	24.43	25.00
3GPP Rel 99	RMK 12.2Kops	23.33	23.32	23.45	24.50	23.38	23.44	23.46	24.50	24.23	24.31	24.45	25.00
3GPP Rel 6	HSDPA Subtest-1	23.16	23.16	23.12	24.50	23.24	23.26	23.36	24.50	24.09	24.15	24.21	25.00
3GPP Rel 6	HSDPA Subtest-2	23.16	23.11	23.07	24.50	23.18	23.26	23.30	24.50	24.12	24.09	24.23	25.00
3GPP Rel 6	HSDPA Subtest-3	22.69	22.64	22.61	24.00	22.67	22.75	22.83	24.00	23.60	23.64	23.74	24.50
3GPP Rel 6	HSDPA Subtest-4	22.68	22.64	22.61	24.00	22.70	22.74	22.84	24.00	23.61	23.57	23.62	24.50
3GPP Rel 8	DC-HSDPA Subtest-1	23.11	23.15	23.13	24.50	23.22	23.21	23.33	24.50	24.02	24.11	24.21	25.00
3GPP Rel 8	DC-HSDPA Subtest-2	23.13	23.14	23.11	24.50	23.19	23.24	23.31	24.50	24.05	24.09	24.21	25.00
3GPP Rel 8	DC-HSDPA Subtest-3	22.66	22.64	22.60	24.00	22.63	22.71	22.83	24.00	23.61	23.61	23.73	24.50
3GPP Rel 8	DC-HSDPA Subtest-4	22.67	22.62	22.61	24.00	22.67	22.69	22.81	24.00	23.60	23.65	23.71	24.50
3GPP Rel 6	HSUPA Subtest-1	22.65	22.73	22.84	24.50	22.70	22.80	22.84	24.50	23.06	23.01	23.02	25.00
3GPP Rel 6	HSUPA Subtest-2	21.25	21.15	21.14	22.50	21.26	21.31	21.34	22.50	21.93	22.00	22.03	23.00
3GPP Rel 6	HSUPA Subtest-3	22.15	22.12	22.12	23.50	22.22	22.33	22.38	23.50	22.92	22.89	23.01	24.00
3GPP Rel 6	HSUPA Subtest-4	20.76	20.65	20.66	22.50	20.78	20.80	20.84	22.50	21.51	21.38	21.53	23.00
3GPP Rel 6	HSUPA Subtest-5	22.70	22.60	22.60	24.50	22.70	22.80	22.80	24.50	23.40	23.50	23.50	25.00

Band 2 (1900MHz Band)									
Part 24E									
SW (MHz)	Modulation	RB Size	RB Offset	Power Max Ch./Freq.	Power Min Ch./Freq.	Power High Ch./Freq.	Turn-up Time (sec)	MFR (dB)	
Channel									
Frequency (MHz)									
20	QPSK	1	0	23.23	23.10	23.32			
20	QPSK	1	49	23.30	23.16	23.34			24.5
20	QPSK	1	99	22.92	22.80	22.91			
20	QPSK	50	0	22.19	22.05	22.19			
20	QPSK	50	24	22.19	22.05	22.17			23.5
20	QPSK	50	50	22.18	22.10	22.13			
20	QPSK	100	0	22.46	22.32	22.46			
20	QPSK	100	49	22.47	22.37	22.50			
20	16QAM	1	49	22.58	22.43	22.64			23.5
20	16QAM	1	99	22.24	22.20	22.14			
20	16QAM	50	0	21.17	21.08	21.19			
20	16QAM	50	24	21.22	21.20	21.18			22.5
20	16QAM	50	50	21.18	21.10	21.12			
20	16QAM	100	0	21.17	21.07	21.13			
20	16QAM	100	49	21.52	21.54	21.43			
20	16QAM	100	99	21.52	21.50	21.41			22.5
20	16QAM	1	99	21.52	21.50	21.43			
20	16QAM	50	0	20.92	20.84	20.92			
20	16QAM	50	24	20.93	20.90	20.91			21.5
20	16QAM	50	50	20.83	20.47	20.45			
20	16QAM	100	0	20.59	20.40	20.49			
Channel									
Frequency (MHz)									
15	QPSK	1	0	19.67	19.66	19.62	Turn-up Time (sec)	MFR (dB)	
15	QPSK	1	37	19.36	19.32	19.29			24.5
15	QPSK	1	74	19.62	19.68	19.60			
15	QPSK	36	0	22.18	22.13	22.13			
15	QPSK	36	36	22.19	22.15	22.14			23.5
15	QPSK	36	72	22.18	22.15	22.14			
15	16QAM	1	0	22.40	22.30	22.38			
15	16QAM	1	37	22.54	22.50	22.38			23.5
15	16QAM	1	74	22.38	22.37	22.30			
15	16QAM	36	0	21.21	21.19	21.13			
15	16QAM	36	36	21.22	21.20	21.17			22.5
15	16QAM	36	72	21.17	21.11	21.11			
15	16QAM	75	0	21.21	21.18	21.11			
15	16QAM	75	36	21.62	21.60	21.52			
15	16QAM	1	37	21.62	21.70	21.63			22.5
15	16QAM	1	74	21.59	21.57	21.44			
15	16QAM	36	0	20.93	20.90	20.91			
15	16QAM	36	36	20.92	20.90	20.44			21.5
15	16QAM	36	72	20.94	20.46	20.43			
15	16QAM	75	0	20.54	20.48	20.47			
Channel									
Frequency (MHz)									
10	QPSK	1	0	23.17	23.00	23.03			
10	QPSK	1	25	23.25	23.19	23.14			24.5
10	QPSK	49	0	22.99	22.94	22.92			
10	QPSK	25	0	22.18	22.14	22.14			
10	QPSK	25	12	22.20	22.17	22.15			23.5
10	QPSK	25	25	22.20	22.15	22.15			
10	16QAM	1	0	22.40	22.30	22.28			
10	16QAM	1	49	22.44	22.33	22.29			23.5
10	16QAM	1	99	22.12	22.10	22.09			
10	16QAM	25	0	21.21	21.15	21.13			22.5
10	16QAM	25	12	21.20	21.20	21.13			
10	16QAM	25	25	21.21	21.20	21.11			
10	16QAM	50	0	21.21	21.18	21.11			
10	16QAM	50	25	21.84	21.86	21.79			21.5
10	16QAM	1	25	22.05	22.00	21.85			22.5
10	16QAM	1	49	22.06	21.92	21.77			
10	16QAM	1	99	21.88	21.82	21.77			
10	16QAM	25	0	20.78	20.76	20.69			
10	16QAM	25	12	20.83	20.78	20.73			21.5
10	16QAM	25	25	20.84	20.78	20.73			
10	16QAM	50	0	20.81	20.77	20.69			
Channel									
Frequency (MHz)									
5	QPSK	1	0	23.00	22.97	22.97	Turn-up Time (sec)	MFR (dB)	
5	QPSK	1	12	23.24	23.24	23.24			24.5
5	QPSK	1	24	22.97	22.96	22.96			
5	QPSK	12	0	22.18	22.09	22.07			
5	QPSK	12	7	22.26	22.17	22.15			23.5
5	QPSK	12	13	22.26	22.15	22.07			
5	QPSK	25	0	22.22	22.14	22.10			
5	16QAM	1	0	22.39	22.31	22.15			23.5
5	16QAM	1	12	22.39	22.31	22.15			
5	16QAM	1	24	22.36	22.24	22.17			
5	16QAM	12	7	21.19	21.18	21.14			22.5
5	16QAM	12	13	21.28	21.18	21.11			
5	16QAM	25	0	21.62	21.60	21.54			
5	16QAM	1	12	21.79	21.70	21.66			22.5
5	16QAM	1	24	21.62	21.63	21.63			
5	16QAM	12	0	20.48	20.50	20.41			
5	16QAM	12	7	20.54	20.56	20.47			21.5
5	16QAM	12	13	20.51	20.56	20.46			
5	16QAM	25	0	20.55	20.50	20.43			
Channel									
Frequency (MHz)									
3	QPSK	1	0	23.19	23.10	23.05	Turn-up Time (sec)	MFR (dB)	
3	QPSK	1	4	23.20	23.08	23.05			24.5
3	QPSK	1	14	23.18	23.07	23.03			
3	QPSK	8	0	22.21	22.10	22.10			
3	QPSK	8	4	22.27	22.16	22.13			23.5
3	QPSK	8	7	22.25	22.11	22.07			
3	QPSK	16	0	22.24	22.14	22.11			
3	16QAM	1	0	22.46	22.34	22.28			
3	16QAM	1	8	22.47	22.30	22.24			23.5
3	16QAM	1	14	22.50	22.30	22.28			
3	16QAM	8	0	21.52	21.50	21.16			22.5
3	16QAM	8	4	21.30	21.26	21.18			
3	16QAM	8	7	21.31	21.20	21.13			
3	16QAM	16	0	21.29	21.18	21.10			
3	16QAM	1	0	21.63	21.43	21.43			22.5
3	16QAM	1	8	21.79	21.60	21.42			
3	16QAM	1	14	21.74	21.63	21.52			
3	16QAM	8	0	20.55	20.50	20.43			
3	16QAM	8	4	20.59	20.50	20.49			21.5
3	16QAM	8	7	20.64	20.57	20.41			
3	16QAM	15	0	20.57	20.47	20.41			
Channel									
Frequency (MHz)									
1.4	QPSK	1	0	23.07	22.90	22.91	Turn-up Time (sec)	MFR (dB)	
1.4	QPSK	1	0	22.88	22.90	22.91			24.5
1.4	QPSK	1	5	22.91	22.90	22.90			
1.4	QPSK	3	0	22.18	22.08	22.02			
1.4	QPSK	3	3	22.17	22.07	22.03			23.5
1.4	QPSK	3	6	22.19	22.06	22.02			
1.4	16QAM	1	0	22.39	22.30	22.28			
1.4	16QAM	1	3	22.40	22.31	22.29			23.5
1.4	16QAM	1	6	22.38	22.29	22.27			
1.4	16QAM	1	9	22.35	22.26	22.23			
1.4	16QAM	3	0	22.64	22.58	22.18			22.5
1.4	16QAM	3	3	21.68	21.61	21.13			
1.4	16QAM	6	0	21.15	21.18	21.26			22.5
1.4	16QAM	1	0	21.31	21.43	21.44			
1.4	16QAM	1	3	21.42	21.51	21.67			22.5
1.4	16QAM	1	6	21.44	21.54	21.68			
1.4	16QAM	3	0	21.20	21.30	21.41			
1.4	16QAM	3	3	21.37	21.47	21.63			
1.4	16QAM	3	6	21.34	21.39	21.49			21.5

Band 4 (AWS Band)									
Part 27L (only on channel required)									
SW (MHz)	Modulation	RB Size	RB Offset	Power/Ch. Offset	Power/Ch. Offset	Power/Ch. Offset	Turn-up Time (sec)	MFR (dB)	
Channel									
Frequency (MHz)									
20	QPSK	1	0	23.12	23.04	23.10			
20	QPSK	1	49	23.11	23.13	23.23			24.5
20	QPSK	50	0	22.10	22.01	22.10			
20	QPSK	50	24	22.08	22.12	22.14			23.5
20	QPSK	50	50	22.03	22.06	22.03			
20	QPSK	100	0	22.43	22.34	22.41			
20	QPSK	100	49	22.54	22.35	22.34			
20	16QAM	1	49	22.44	22.47	22.52			23.5
20	16QAM	1	99	22.15	22.20	22.22			
20	16QAM	50	0	22.10	22.01	22.10			
20	16QAM	50	24	22.11	22.16	22.13			22.5
20	16QAM	50	50	22.03	22.06	22.03			
20	16QAM	100	0	22.43	22.34	22.41			
20	16QAM	100	49	22.54	22.35	22.34			
							Turn-up Time (sec)	MFR (dB)	
Frequency (MHz)									
15	QPSK	1	0	22.84	23.01	23.05			
15	QPSK	1	49	22.83	23.13	23.17			24.5
15	QPSK	1	99	22.86	22.90	22.85			
15	QPSK	50	0	22.12	22.11	22.14			
15	QPSK	50	24	22.11	22.16	22.13			23.5
15	QPSK	50	50	22.06	22.09	22.12			
15	QPSK	100	0	22.07	22.10	22.13			
15	QPSK	100	49	22.08	22.11	22.14			
15	16QAM	1	49	22.43	22.45	22.53			23.5
15	16QAM	1	99	22.16	22.20	22.24			
15	16QAM	50	0	22.11	22.14	22.19			
15	16QAM	50	24	22.14	22.18	22.18			22.5
15	16QAM	50	50	22.07	22.10	22.13			
15	16QAM	100	0	22.40	22.33	22.40			
15	16QAM	100	49	22.51	22.38	22.45			
15	16QAM	100	99	22.58	22.44	22.45			
							Turn-up Time (sec)	MFR (dB)	
Channel									
Frequency (MHz)									
10	QPSK	1	0	22.84	22.96	23.00			
10	QPSK	1	49	22.82	22.96	23.00			24.5
10	QPSK	1	99	22.85	22.90	22.85			
10	QPSK	50	0	22.07	22.08	22.10			
10	QPSK	50	24	22.02	22.08	22.10			23.5
10	QPSK	50	50	22.03	22.07	22.10			
10	QPSK	100	0	22.36	22.32	22.37			
10	QPSK	100	49	22.43	22.44	22.54			23.5
10	QPSK	100	99	22.50	22.45	22.45			
10	16QAM	1	49	22.12	22.16	22.21			
10	16QAM	1	99	22.13	22.18	22.21			
10	16QAM	50	0	22.11	22.14	22.19			
10	16QAM	50	24	22.17	22.18	22.23			
10	16QAM	50	50	22.16	22.15	22.21			22.5
10	16QAM	100	0	22.40	22.33	22.40			
10	16QAM	100	49	22.51	22.38	22.45			
10	16QAM	100	99	22.58	22.44	22.45			
10	16QAM	25	12	22.40	22.41	22.47			23.5
10	16QAM	25	36	22.47	22.43	22.43			
10	16QAM	25	60	22.54	22.47	22.47			
							Turn-up Time (sec)	MFR (dB)	
Channel									
Frequency (MHz)									
5	QPSK	1	0	22.81	22.88	22.92			
5	QPSK	1	12	23.13	23.14	23.13			24.5
5	QPSK	1	24	23.13	23.14	23.13			
5	QPSK	12	0	21.96	21.99	22.00			
5	QPSK	12	7	22.03	22.06	22.14			23.5
5	QPSK	12	13	22.08	22.09	22.10			
5	QPSK	25	0	21.97	22.00	22.08			
5	QPSK	25	7	22.13	22.21	22.22			23.5
5	QPSK	25	13	22.48	22.41	22.41			
5	16QAM	1	24	22.16	22.17	22.29			
5	16QAM	1	36	22.02	22.08	22.11			22.5
5	16QAM	12	13	21.08	21.10	21.17			
5	16QAM	12	25	21.10	21.12	21.19			
5	16QAM	25	0	21.27	21.44	21.38			
5	16QAM	25	12	21.60	21.62	21.74			22.5
5	16QAM	25	25	21.67	21.64	21.64			
5	16QAM	12	7	20.25	20.27	20.33			23.5
5	16QAM	12	19	20.37	20.37	20.44			
5	16QAM	12	33	20.48	20.48	20.50			
5	16QAM	25	0	20.29	20.29	20.39			
							Turn-up Time (sec)	MFR (dB)	
Channel									
Frequency (MHz)									
3	QPSK	1	0	22.89	22.93	22.99			
3	QPSK	1	7	22.94	22.94	23.04			24.5
3	QPSK	1	14	22.92	22.96	23.00			
3	QPSK	8	0	21.64	21.66	22.08			
3	QPSK	8	7	21.96	22.03	22.05			23.5
3	QPSK	16	0	21.97	21.96	22.07			
3	QPSK	16	7	22.02	22.02	22.10			
3	16QAM	1	8	22.06	22.08	22.33			23.5
3	16QAM	1	14	22.27	22.31	22.36			
3	16QAM	8	0	21.48	21.54	21.54			22.5
3	16QAM	8	7	21.50	21.51	21.59			
3	16QAM	8	14	21.48	21.46	21.54			
3	16QAM	8	21	21.30	21.43	21.43			22.5
3	16QAM	16	0	21.42	21.42	21.54			
3	16QAM	16	7	21.56	21.56	21.64			
3	16QAM	8	0	20.27	20.32	20.38			23.5
3	16QAM	8	7	20.28	20.28	20.42			
3	16QAM	8	14	20.34	20.32	20.49			
3	16QAM	16	0	20.29	20.27	20.38			
3	16QAM	16	7	20.32	20.32	20.49			
							Turn-up Time (sec)	MFR (dB)	
Channel									
Frequency (MHz)									
1.4	QPSK	1	0	22.89	22.92	23.04			
1.4	QPSK	1	7	22.92	22.93	23.00			24.5
1.4	QPSK	8	0	22.07	22.09	22.29			
1.4	QPSK	3	1	21.08	21.10	21.15			
1.4	QPSK	3	3	22.09	22.03	22.11			23.5
1.4	QPSK	3	5	22.08	22.08	22.15			
1.4	QPSK	8	0	22.18	22.20	22.35			
1.4	QPSK	1	3	22.34	22.38	22.46			
1.4	QPSK	1	5	22.32	22.35	22.41			22.5
1.4	16QAM	1	0	22.02	22.08	22.13			
1.4	16QAM	1	7	22.04	22.09	22.18			
1.4	16QAM	1	14	22.09	22.10	22.19			
1.4	16QAM	8	0	21.15	21.18	21.26			22.5
1.4	16QAM	8	7	21.31	21.43	21.43			
1.4	16QAM	8	14	21.42	21.42	21.54			
1.4	16QAM	8	21	21.44	21.54	21.66			22.5
1.4	16QAM	16	0	21.42	21.42	21.54			
1.4	16QAM	1	1	21.37	21.41	21.53			
1.4	16QAM	3	3	21.34	21.39	21.49			23.5

Band 12 (700MHz Low Band)									
Part 27F(only on channel required)									
BW (MHz)	Modulation	RB Size	RB Offset	Power Low Ch / Freq.	Power High Ch / Freq.	Power Mid Ch / Freq.	Power High Ch / Freq.	Turn-up (mW)	MFR (dB)
Channel									
Frequency (MHz)									
10	QPSK	1	0	23.77	23.25	23.77			
10	QPSK	1	25	23.90	23.90	23.90		25	0
10	QPSK	1	40	23.78	23.78	24.02			
10	QPSK	25	0	23.97	22.98	23.98		24	1
10	QPSK	25	12	23.90	23.91	22.98			
10	QPSK	25	25	23.95	22.89	22.83			
10	QPSK	50	0	23.99	22.92	22.96			
10	QPSK	50	1	23.94	23.05	22.15		24	1
10	QPSK	1	25	23.30	23.17	23.28			
10	QPSK	1	40	23.08	23.02	23.15			
10	QPSK	25	0	22.90	21.90	21.86			
10	QPSK	25	12	21.96	21.95	21.90		23	2
10	QPSK	25	25	21.98	21.92	21.84			
10	QPSK	50	0	22.01	21.82	21.85			
10	QPSK	1	0	22.96	21.85	22.03			
10	QPSK	1	25	22.94	22.08	22.14		23	2
10	QPSK	1	40	21.98	21.95	22.22			
10	QPSK	25	0	22.99	20.99	20.95			
10	QPSK	25	12	20.94	20.92	20.87		22	3
10	QPSK	25	25	20.91	20.89	20.83			
10	QPSK	50	0	20.94	20.92	20.84			
Channel									
Frequency (MHz)									
5	QPSK	1	0	23.70	23.70	23.74		Turn-up (mW)	MFR (dB)
5	QPSK	1	12	23.95	23.93	23.93		25	0
5	QPSK	1	24	23.88	23.85	23.98			
5	QPSK	12	0	22.92	22.88	22.87			
5	QPSK	12	7	22.91	22.88	22.87		24	1
5	QPSK	12	13	22.82	22.85	22.84			
5	QPSK	25	0	22.97	22.97	22.97			
5	QPSK	1	0	22.87	23.13	22.82			
5	QPSK	1	12	23.26	23.26	23.19		24	1
5	QPSK	1	24	23.96	23.98	23.84			
5	QPSK	12	0	21.87	21.88	21.88			
5	QPSK	12	7	21.91	21.89	21.92		23	2
5	QPSK	12	13	21.82	21.85	21.88			
5	QPSK	25	0	21.86	21.88	21.92			
5	QPSK	1	0	21.80	21.81	21.86			
5	QPSK	1	12	22.21	22.15	22.11		23	2
5	QPSK	1	24	21.90	21.93	22.28			
5	QPSK	12	0	20.91	20.94	20.96			
5	QPSK	12	7	20.90	20.89	20.90		22	3
5	QPSK	12	13	20.84	20.81	20.80			
5	QPSK	25	0	20.84	20.86	20.87			
Channel									
Frequency (MHz)									
3	QPSK	1	0	23.76	23.74	23.73		Turn-up (mW)	MFR (dB)
3	QPSK	1	8	23.78	23.74	23.78		25	0
3	QPSK	1	14	23.77	23.62	24.00			
3	QPSK	1	20	23.81	22.84	22.88			
3	QPSK	8	4	22.87	22.84	22.92		24	1
3	QPSK	15	0	22.83	22.82	22.90			
3	QPSK	1	0	23.86	23.80	23.98			
3	QPSK	1	8	23.91	23.93	23.97		24	1
3	QPSK	1	14	23.11	23.09	23.25			
3	QPSK	1	20	21.90	21.93	21.89			
3	QPSK	8	4	21.95	21.90	22.01		23	2
3	QPSK	8	7	21.90	21.81	22.16			
3	QPSK	15	0	21.88	21.84	22.00			
3	QPSK	1	0	22.01	22.01	21.91			
3	QPSK	1	8	22.01	22.03	21.96		23	2
3	QPSK	1	14	22.00	21.99	22.27			
3	QPSK	1	20	22.06	22.01	22.00			
3	QPSK	8	4	20.88	20.80	20.87		22	3
3	QPSK	8	7	20.90	20.86	21.17			
3	QPSK	15	0	20.77	20.77	20.84			
Channel									
Frequency (MHz)									
1.4	QPSK	1	0	23.65	23.70	23.69		Turn-up (mW)	MFR (dB)
1.4	QPSK	1	3	23.84	23.82	24.13			
1.4	QPSK	1	5	23.60	23.68	24.00		25	0
1.4	QPSK	3	0	23.80	23.79	23.95			
1.4	QPSK	3	1	23.84	23.83	24.09			
1.4	QPSK	3	3	23.82	23.85	24.02			
1.4	QPSK	6	0	22.80	22.85	23.10		24	1
1.4	QPSK	1	0	22.99	22.97	22.99			
1.4	QPSK	1	3	23.18	23.14	23.40			
1.4	QPSK	1	5	22.94	22.99	22.92		24	1
1.4	QPSK	1	0	22.99	22.99	22.96			
1.4	QPSK	3	1	22.90	22.91	23.03			
1.4	QPSK	3	3	22.86	22.80	23.14			
1.4	QPSK	6	0	21.90	21.91	22.26		20	2
1.4	QPSK	1	0	21.92	21.93	21.96			
1.4	QPSK	1	3	22.04	22.02	22.18			
1.4	QPSK	1	5	22.02	22.00	22.21			
1.4	QPSK	3	0	21.88	21.89	22.11		23	2
1.4	QPSK	3	1	21.97	21.93	22.19			
1.4	QPSK	3	3	21.95	21.89	22.37			
1.4	QPSK	6	0	20.78	20.82	21.06		22	3

Band 13(700MHz Band)									
Part 27F									
BW (MHz)	Modulation	RB Size	RB Offset	Power Low Ch / Freq.	Power Mid Ch / Freq.	Power High Ch / Freq.	Turn-up (dBm)	MFR (dB)	
Channel									
Frequency (MHz)									
10	QPSK	1	0		23.84				
10	QPSK	1	25		23.97		25		
10	QPSK	1	40		23.78				
10	QPSK	25	0		22.85				
10	QPSK	25	12		22.91		24	1	
10	QPSK	25	25		22.94				
10	QPSK	50	0		22.86				
10	QPSK	1	0		22.17				
10	QPSK	1	25		22.12		24	1	
10	QPSK	1	40		22.96				
10	QPSK	25	0		21.86				
10	QPSK	25	12		21.92		23	2	
10	QPSK	25	25		21.84				
10	QPSK	50	0		21.85				
10	QPSK	1	0		22.02				
10	QPSK	1	25		22.10		23	2	
10	QPSK	1	40		21.94				
10	QPSK	25	0		21.85				
10	QPSK	25	12		20.91		22	3	
10	QPSK	25	25		20.83				
10	QPSK	50	0		20.84				
Channel									
Frequency (MHz)									
5	QPSK	1	0	23.69	23.68	23.65	Turn-up (dBm)	MFR (dB)	
5	QPSK	1	12	23.95	23.95	23.90	25	0	
5	QPSK	1	24	23.88	23.85	23.81			
5	QPSK	12	0	22.92	22.80	22.79			
5	QPSK	12	7	22.84	22.88	22.85	24	1	
5	QPSK	12	13	22.86	22.83	22.79			
5	QPSK	25	0	22.90	22.79	22.78			
5	QPSK	1	0	22.95	22.81	22.84			
5	QPSK	1	12	23.20	23.10	23.10	24	1	
5	QPSK	1	24	22.84	22.75	22.85			
5	QPSK	12	0	21.84	21.77	21.79			
5	QPSK	12	7	21.87	21.88	21.85			
5	QPSK	12	13	21.85	21.88	21.81	23	2	
5	QPSK	25	0	21.84	21.84	21.80			
5	QPSK	1	0	21.80	21.82	21.84			
5	QPSK	1	12	22.12	22.10	22.05	23	2	
5	QPSK	1	24	21.81	21.80	21.77			
5	QPSK	12	0	20.81	20.81	20.82			
5	QPSK	12	7	20.82	20.87	20.87	22	3	
5	QPSK	12	13	20.87	20.80	20.81			
5	QPSK	25	0	20.80	20.79	20.79			

Band 17 (700MHz Band)									
Part 27F(only on channel required)									
BW (MHz)	Modulation	RB Size	RB Offset	Power Low Ch / Freq.	Power Mid Ch / Freq.	Power High Ch / Freq.	Turn-up (mW)	MFR (dB)	
Channel									
Frequency (MHz)									
10	QPSK	1	0	23.78	23.78	23.25			
10	QPSK	1	25	23.93	23.82	23.84		25	
10	QPSK	1	40	23.68	23.67	23.65			
10	QPSK	25	0	22.84	22.80	22.81			
10	QPSK	25	12	22.85	22.84	22.85		24	
10	QPSK	25	25	22.77	22.78	22.75		1	
10	QPSK	50	0	22.82	22.79	22.79			
10	QPSK	1	0	22.09	22.02	22.04			
10	QPSK	1	25	22.08	22.06	22.05		24	
10	QPSK	1	40	22.02	22.04	22.05		1	
10	QPSK	25	0	21.85	21.84	21.85			
10	QPSK	25	12	21.87	21.85	21.87		24	
10	QPSK	25	25	21.80	21.80	21.80		2	
10	QPSK	50	0	21.62	21.77	21.77			
10	QPSK	1	0	20.75	20.76	20.75		23	
10	QPSK	1	25	20.51	20.50	20.50		2	
10	QPSK	1	40	20.46	20.47	20.46			
10	QPSK	25	0	20.78	20.77	20.78		22	
10	QPSK	25	12	20.83	20.81	20.82		3	
10	QPSK	25	25	20.76	20.76	20.75			
10	QPSK	50	0	20.75	20.76	20.75			
Channel									
Frequency (MHz)									
5	QPSK	1	0	23.84	23.84	23.63			
5	QPSK	1	40	23.50	23.49	23.51		0	
5	QPSK	1	24	23.81	23.83	23.80			
5	QPSK	1	40	23.75	23.80	23.80			
5	QPSK	12	0	22.81	22.83	22.84		24	
5	QPSK	12	12	22.79	22.79	22.79		1	
5	QPSK	25	0	22.75	22.77	22.78			
5	QPSK	1	0	22.82	22.85	22.87		24	
5	QPSK	1	24	22.84	22.84	22.83		1	
5	QPSK	1	40	22.89	22.91	22.91			
5	QPSK	12	0	21.77	21.76	21.86		23	
5	QPSK	12	12	21.82	21.80	21.83		2	
5	QPSK	12	24	21.81	21.77	21.78			
5	QPSK	25	0	21.81	21.77	21.75			
5	QPSK	25	12	21.88	21.83	21.87		24	
5	QPSK	1	0	22.05	22.05	22.13		2	
5	QPSK	1	12	22.05	22.05	22.13			
5	QPSK	1	24	21.86	21.82	21.77			
5	QPSK	1	36	21.76	21.77	21.76		23	
5	QPSK	12	0	20.82	20.81	20.80			
5	QPSK	12	12	20.79	20.78	20.74			
5	QPSK	12	24	20.75	20.75	20.75			

Configure		CA List	PCC							SCC				Power	
			LTE	BW	UL		Mod.	UL#	UL	LTE	BW	DL		With CA	Without CA
			Band	(MHz)	Freq	Channel				Band	(MHz)	Freq	Channel	Tx. Power	Tx. Power
					(MHz)							(MHz)		(dBm)	(dBm)
Inter-Band		CA_2A-5A	Band 2	20M	1880	18900	QPSK	1	0	Band 5	10M	881.5	2325	23.05	23.35
			Band 5	10M	836.5	20525	QPSK	1	0	Band 2	20M	1960	900	24.01	24.19
		CA_2A-7A	Band 2	20M	1880	18900	QPSK	1	0	Band 7	20M	2655	3100	23.13	23.35
			Band 7	20M	2560	21350	QPSK	1	49	Band 2	20M	1960	900	21.90	22.14
		CA_4A-5A	Band 4	20M	1732.5	20175	QPSK	1	0	Band 5	10M	881.5	2325	23.09	23.24
			Band 5	10M	836.5	20525	QPSK	1	0	Band 4	20M	2132.5	2175	23.93	24.19
		CA_4A-7A	Band 4	20M	1732.5	20175	QPSK	1	0	Band 7	20M	2655	3100	23.03	23.24
			Band 7	20M	2560	21350	QPSK	1	49	Band 4	20M	2132.5	2175	21.82	22.14
		CA_4A-12A	Band 4	20M	1732.5	20175	QPSK	1	0	Band 12	10M	737.5	5095	23.05	23.24
			Band 12	10M	711	23130	QPSK	1	25	Band 4	20M	2132.5	2175	23.74	24.22
		CA_4A-17A	Band 4	20M	1732.5	20175	QPSK	1	0	Band 17	10M	740	5790	23.04	23.24
			Band 17	10M	709	23780	QPSK	1	25	Band 4	10M	2132.5	2175	23.72	23.93
		CA_5A-7A	Band 5	10M	836.5	20525	QPSK	1	0	Band 7	20M	2655	3100	23.97	24.19
			Band 7	20M	2560	21350	QPSK	1	49	Band 5	10M	881.5	2325	22.05	22.14
		CA_5A-66A	Band 5	10M	836.5	20525	QPSK	1	0	Band 66	20M	2155	66886	23.93	24.19
			Band 66	20M	1770	132572	QPSK	1	49	Band 5	10M	881.5	2325	23.21	23.46
		CA_12A-66A	Band 12	10M	711	23130	QPSK	1	25	Band 66	20M	2155	66886	23.89	24.22
			Band 66	20M	1770	132572	QPSK	1	49	Band 12	10M	737.5	5095	23.25	23.46
Intra-Band	Contiguous	CA_2C	Band 2	20M	1880	18900	QPSK	1	0	Band 2	20M	1979.8	1098	23.17	23.35
		CA_7C	Band 7	20M	2560	21350	QPSK	1	49	Band 7	20M	2660.2	3152	21.86	22.14
		CA_86B	Band 66	15M	1772.5	132597	QPSK	1	37	Band 66	5M	2188.2	67218	23.23	23.41
		CA_86C	Band 66	20M	1770	132572	QPSK	1	49	Band 66	20M	2170.2	67038	23.31	23.46
	Non-Contiguous	CA_4A-4A	Band 4	20M	1732.5	20175	QPSK	1	0	Band 4	5M	2152.5	2375	23.15	23.24
		CA_7A-7A	Band 7	20M	2560	21350	QPSK	1	49	Band 7	5M	2622.5	2775	21.92	22.14
		CA_66A-66A	Band 66	20M	1770	132572	QPSK	1	49	Band 66	5M	2112.5	66461	23.34	23.46

2.4GHz WLAN	Ant 1					
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN	802.11b 1Mbps	1	2412	15.92	16.50	100.00
		6	2437	15.63	16.50	
		11	2462	15.86	16.50	
	802.11g 6Mbps	1	2412	13.92	14.50	96.94
		6	2437	14.44	14.50	
		11	2462	12.65	14.50	
	802.11n-HT20 MCS0	1	2412	13.76	15.00	96.17
		6	2437	14.52	15.00	
		11	2462	13.09	15.00	

5GHz WLAN	Ant 1					
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN	802.11a 6Mbps	36	5180	12.72	14.50	96.94
		40	5200	13.34	14.50	
		44	5220	13.64	14.50	
		48	5240	14.02	14.50	
	802.11n-HT20 MCS0	36	5180	12.62	14.00	96.72
		40	5200	12.73	14.00	
		44	5220	12.92	14.00	
		48	5240	13.31	14.00	
	802.11n-HT40 MCS0	38	5190	10.71	12.00	87.84
		46	5230	11.90	12.00	
	802.11ac-VHT20 MCS0	36	5180	12.07	13.50	96.63
		40	5200	12.48	13.50	
		44	5220	12.94	13.50	
		48	5240	13.24	13.50	
	802.11ac-VHT40 MCS0	38	5190	10.95	12.00	87.89
		46	5230	11.48	12.00	
	802.11ac-VHT80 MCS0	42	5210	9.92	11.00	78.32

5GHz WLAN	Ant 1					
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.3GHz WLAN	802.11a 6Mbps	52	5260	14.79	15.50	96.94
		56	5280	14.42	15.50	
		60	5300	14.88	15.50	
		64	5320	13.76	15.50	
	802.11n-HT20 MCS0	52	5260	13.73	15.00	96.72
		56	5280	13.70	15.00	
		60	5300	13.45	15.00	
		64	5320	13.79	15.00	
	802.11n-HT40 MCS0	54	5270	11.68	12.00	87.84
		62	5310	10.57	12.00	
	802.11ac-VHT20 MCS0	52	5260	14.21	15.00	96.63
		56	5280	13.50	15.00	
		60	5300	13.93	15.00	
		64	5320	12.06	13.00	
	802.11ac-VHT40 MCS0	54	5270	11.22	12.00	87.89
		62	5310	11.45	12.00	
	802.11ac-VHT80 MCS0	58	5290	7.94	9.00	78.32

5GHz WLAN	Ant 1					
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.5GHz WLAN	802.11a 6Mbps	100	5500	15.09	15.50	96.94
		116	5580	15.36	15.50	
		132	5660	15.34	15.50	
		140	5700	12.88	14.00	
	802.11n-HT20 MCS0	100	5500	14.61	15.50	96.72
		116	5580	14.37	15.50	
		132	5660	14.41	15.50	
		140	5700	14.17	15.50	
	802.11n-HT40 MCS0	102	5510	9.98	11.00	87.84
		110	5550	13.05	14.00	
		134	5670	12.13	14.00	
	802.11ac-VHT20 MCS0	100	5500	13.84	15.50	96.63
		116	5580	14.44	15.50	
		132	5660	14.56	15.50	
		140	5700	11.78	13.00	
	802.11ac-VHT40 MCS0	102	5510	12.51	14.00	87.89
		110	5550	12.60	14.00	
		134	5670	12.02	14.00	
	802.11ac-VHT80 MCS0	106	5530	11.24	13.00	78.32

5GHz WLAN	Ant 1					
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.8GHz WLAN	802.11a 6Mbps	149	5745	15.30	15.50	96.94
		157	5785	15.35	15.50	
		165	5825	14.97	15.50	
	802.11n-HT20 MCS0	149	5745	14.37	15.50	96.72
		157	5785	14.60	15.50	
		165	5825	14.28	15.50	
	802.11n-HT40 MCS0	151	5755	12.31	14.00	87.84
		159	5795	12.60	14.00	
	802.11ac-VHT20 MCS0	149	5745	14.38	15.50	96.63
		157	5785	14.54	15.50	
		165	5825	14.11	15.50	
	802.11ac-VHT40 MCS0	151	5755	12.33	13.00	87.89
		159	5795	12.58	13.00	
	802.11ac-VHT80 MCS0	155	5775	11.75	13.00	78.32

Bluetooth BR/EDR

Mode	Channel	Frequency (MHz)	Average power (dBm)		
			1Mbps	2Mbps	3Mbps
BR / EDR	CH 00	2402	10.32	8.73	8.83
	CH 39	2441	10.15	8.39	8.42
	CH 78	2480	10.49	8.59	8.63
Tune-up Limit			11	11	11

Bluetooth LE v4.0

Mode	Channel	Frequency (MHz)	Average power (dBm)
			GFSK
LE	CH 00	2402	4.66
	CH 19	2440	5.37
	CH 39	2480	4.81
Tune-up Limit			6.5

Bluetooth LE v5.0

Mode	Channel	Frequency (MHz)	Average power (dBm)
LE	CH 00	2402	4.83
	CH 19	2440	5.06
	CH 39	2480	4.66
Tune-up Limit			6.5