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Accreditation No.: **SCS 0108**

Client **Sporton**

Certificate No: **EX3-3935_May20**

CALIBRATION CERTIFICATE

Object **EX3DV4 - SN:3935**

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: **May 27, 2020**

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
Power meter NRP	SN: 104778	01-Apr-20 (No. 217-03100/03101)	Apr-21
Power sensor NRP-Z91	SN: 103244	01-Apr-20 (No. 217-03100)	Apr-21
Power sensor NRP-Z91	SN: 103245	01-Apr-20 (No. 217-03101)	Apr-21
Reference 20 dB Attenuator	SN: CC2552 (20x)	31-Mar-20 (No. 217-03106)	Apr-21
DAE4	SN: 660	27-Dec-19 (No. DAE4-660_Dec19)	Dec-20
Reference Probe ES3DV2	SN: 3013	31-Dec-19 (No. ES3-3013_Dec19)	Dec-20
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-18)	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-19)	In house check: Oct-20

Calibrated by:	Name Leif Klysner	Function Laboratory Technician	Signature
Approved by:	Name Katja Pokovic	Function Technical Manager	Signature

Issued: June 1, 2020

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 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 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:3935

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu\text{V}/(\text{V}/\text{m})^2$) ^A	0.49	0.53	0.48	$\pm 10.1 \%$
DCP (mV) ^B	102.6	103.2	102.3	

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 ^E (k=2)
0	CW	X	0.0	0.0	1.0	0.00	137.0	$\pm 3.3 \%$	$\pm 4.7 \%$
		Y	0.0	0.0	1.0		150.1		
		Z	0.0	0.0	1.0		141.6		

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.

^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:3935

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	44.5
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:3935

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 (mm) ^G	Unc (k=2)
750	41.9	0.89	10.58	10.58	10.58	0.57	0.80	± 12.0 %
835	41.5	0.90	10.31	10.31	10.31	0.38	0.93	± 12.0 %
900	41.5	0.97	10.16	10.16	10.16	0.40	0.88	± 12.0 %
1750	40.1	1.37	8.60	8.60	8.60	0.27	0.86	± 12.0 %
1900	40.0	1.40	8.35	8.35	8.35	0.24	0.86	± 12.0 %
2000	40.0	1.40	8.25	8.25	8.25	0.34	0.86	± 12.0 %
2300	39.5	1.67	7.86	7.86	7.86	0.35	0.90	± 12.0 %
2450	39.2	1.80	7.60	7.60	7.60	0.33	0.90	± 12.0 %
2600	39.0	1.96	7.43	7.43	7.43	0.37	0.90	± 12.0 %
5250	35.9	4.71	5.04	5.04	5.04	0.40	1.80	± 14.0 %
5600	35.5	5.07	4.76	4.76	4.76	0.40	1.80	± 14.0 %
5750	35.4	5.22	4.67	4.67	4.67	0.40	1.80	± 14.0 %

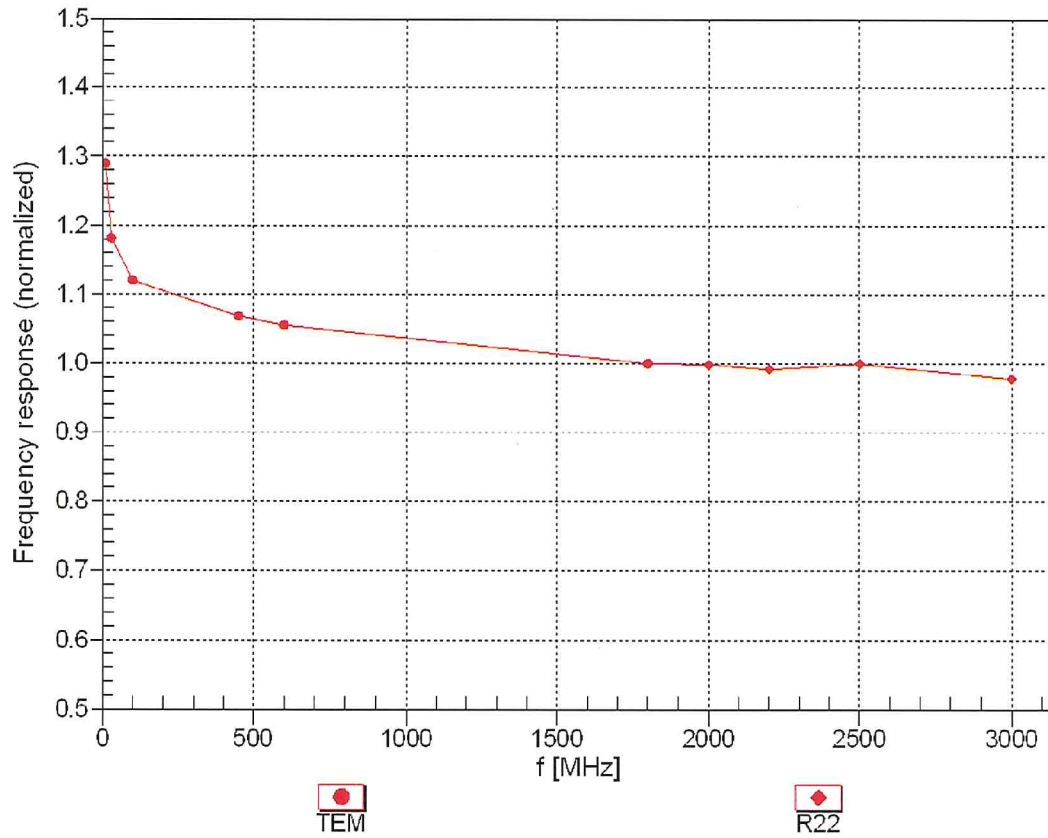
^C Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 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 up to 6 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. 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

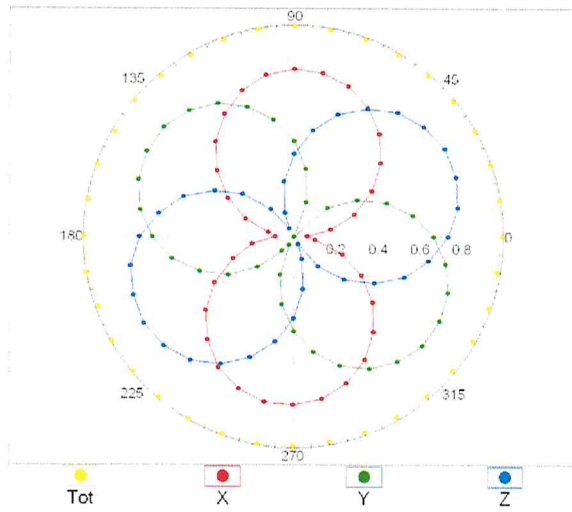
(TEM-Cell:ifi110 EXX, Waveguide: R22)



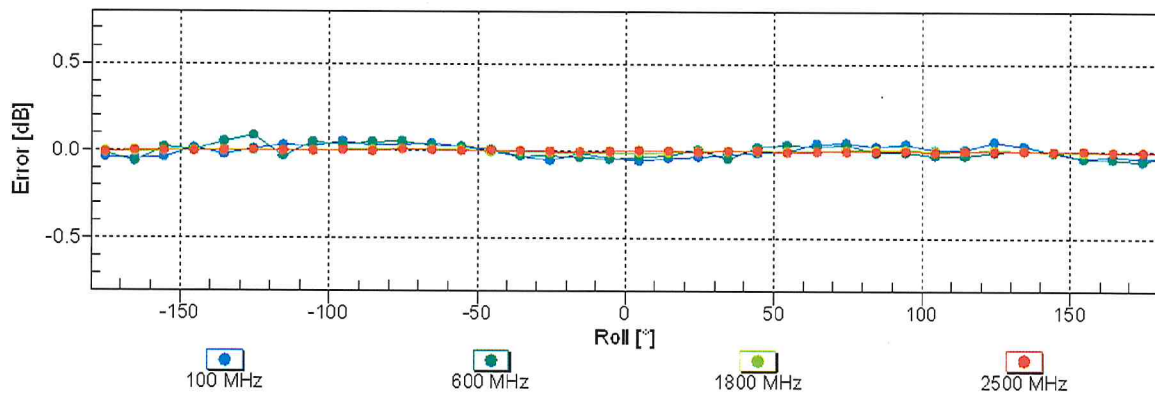
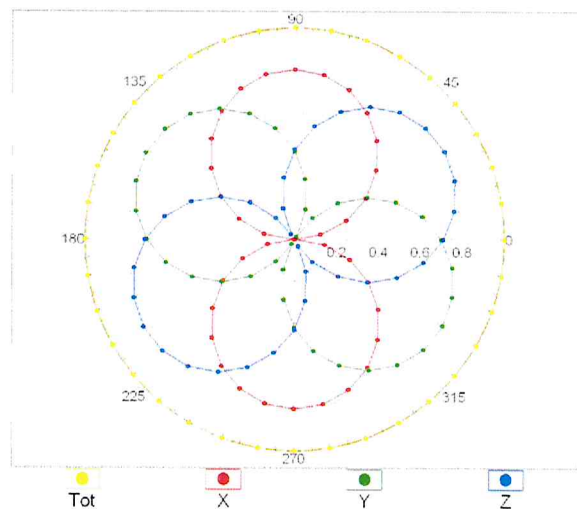
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ (k=2)

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

f=600 MHz,TEM

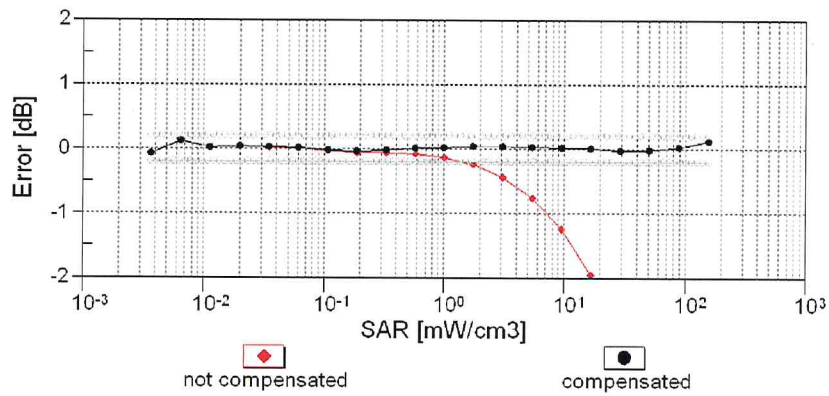
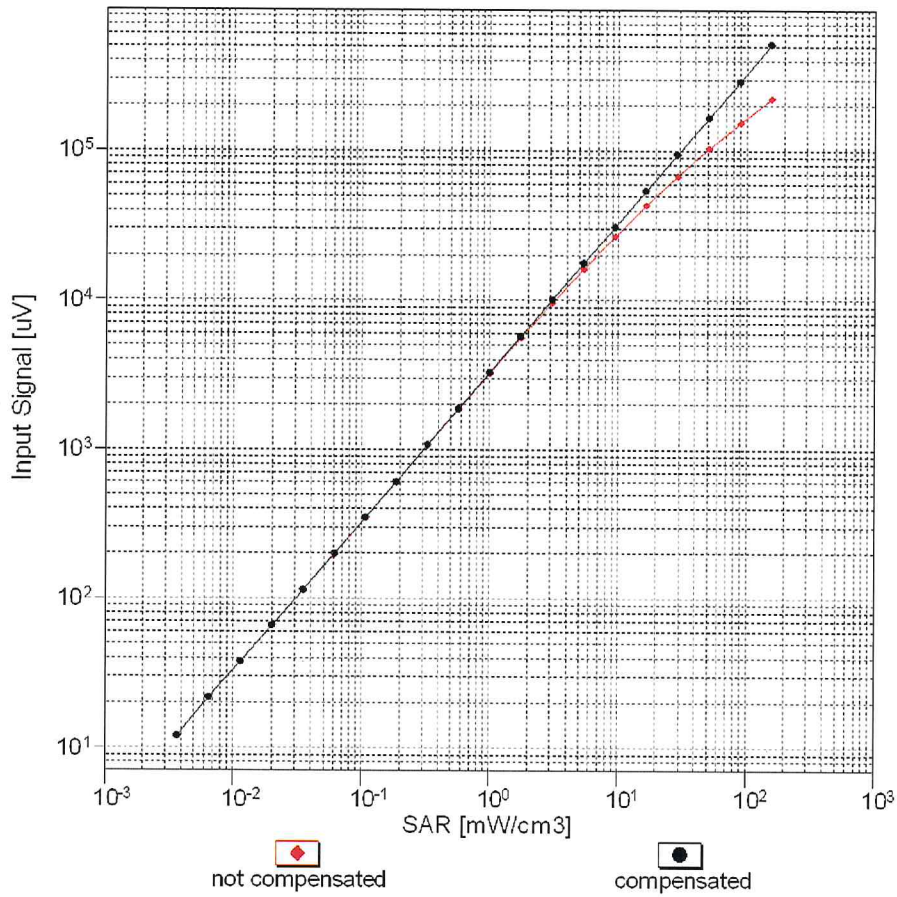


f=1800 MHz,R22



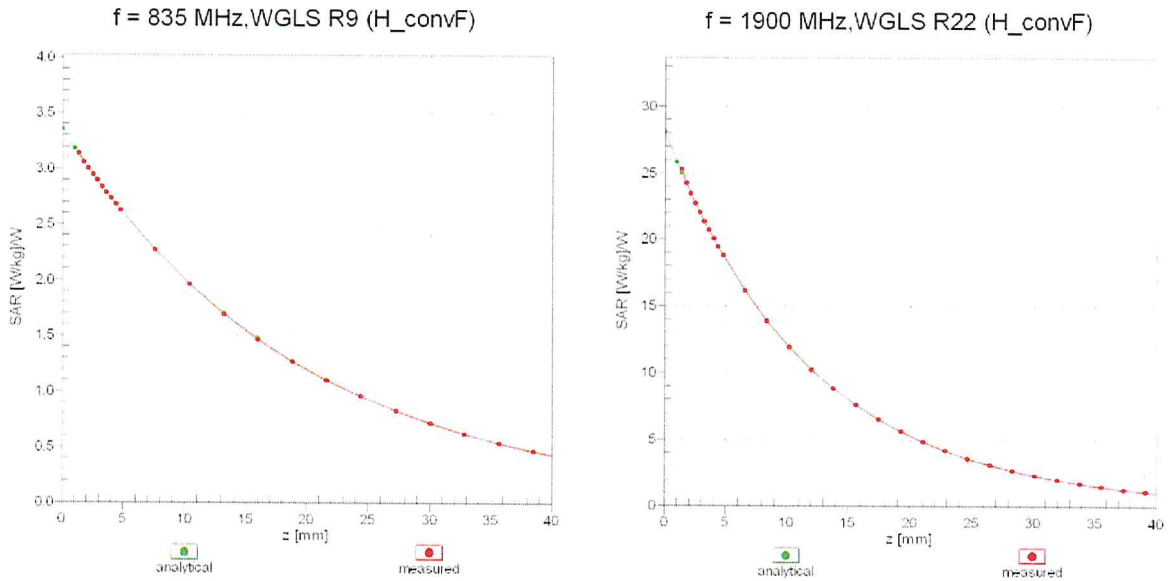
Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

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

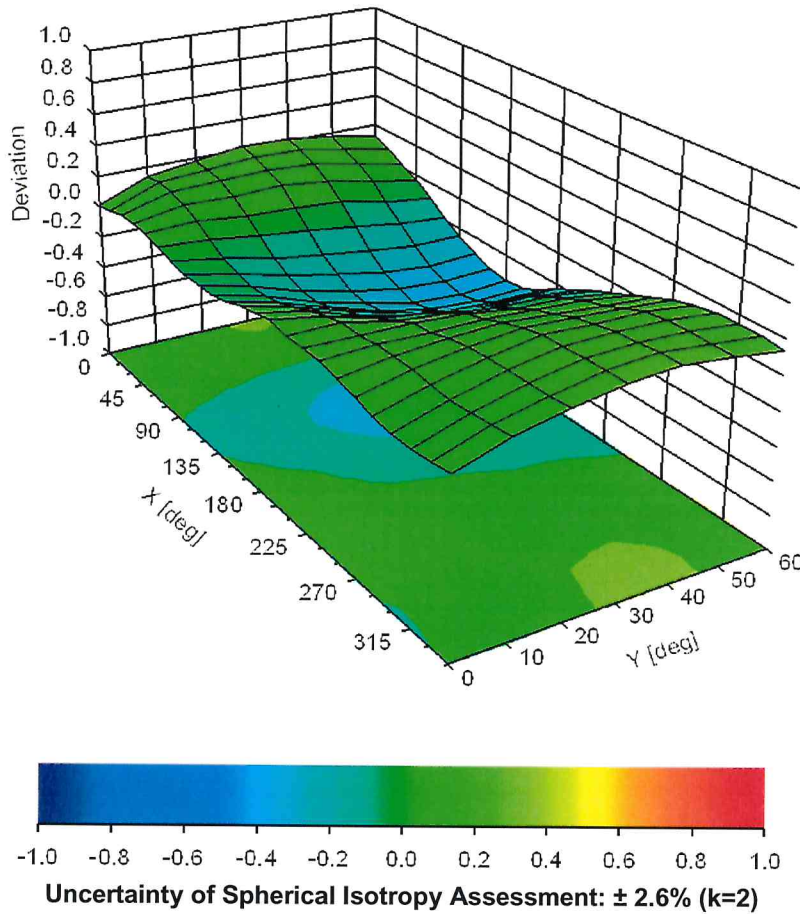


Uncertainty of Linearity Assessment: $\pm 0.6\%$ (k=2)

Conversion Factor Assessment



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





Appendix E. Conducted RF Output Power Table

The detailed power tables are shown as follows.



Power Level for Receiver on

GSM850	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	192	199	251		192	199	251	
TX Channel	834.2	835.4	848.3	834.2	835.4	848.3		
Frequency (MHz)	32.36	32.39	32.32	33.50	23.36	23.39	23.32	24.50
GSM 1 Tx slot	32.35	32.38	32.30	33.50	23.35	23.38	23.30	24.50
GPRS 2 Tx slots	31.57	31.60	31.51	32.50	25.57	25.60	25.51	26.50
GPRS 3 Tx slots	29.85	29.85	29.75	30.50	25.59	25.59	25.49	26.24
GPRS 4 Tx slots	28.68	28.69	28.59	29.50	25.68	25.69	25.59	26.50
EDGE 1 Tx slot	26.67	26.65	26.41	27.50	17.67	17.65	17.41	18.50
EDGE 2 Tx slots	25.41	25.34	25.16	26.50	19.41	19.34	19.16	20.50
EDGE 3 Tx slots	23.01	22.90	22.66	23.50	18.75	18.64	18.40	19.24
EDGE 4 Tx slots	21.81	21.71	21.45	22.50	18.81	18.71	18.45	19.50

GSM1900	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	512	661	810		512	661	810	
TX Channel	1850.2	1880	1909.8	1850.2	1880	1909.8		
Frequency (MHz)	28.76	29.24	28.83	30.50	19.76	20.24	19.83	21.50
GSM 1 Tx slot	28.75	29.23	28.80	30.50	19.75	20.23	19.80	21.50
GPRS 2 Tx slots	28.03	28.50	28.08	29.50	22.03	22.50	22.08	23.50
GPRS 3 Tx slots	26.23	26.50	26.36	27.50	21.97	22.24	22.10	23.24
GPRS 4 Tx slots	25.08	25.45	25.25	26.50	22.08	22.45	22.25	23.50
EDGE 1 Tx slot	24.89	25.11	25.06	26.50	18.69	18.11	18.06	17.50
EDGE 2 Tx slots	23.70	24.12	24.08	25.00	17.70	18.12	18.08	19.00
EDGE 3 Tx slots	21.74	22.14	22.08	23.00	17.48	17.88	17.82	18.74
EDGE 4 Tx slots	20.98	21.08	21.03	22.00	17.98	18.08	18.03	19.00

Band	WCDMA II			Tune-up Limit (dBm)	WCDMA IV			Tune-up Limit (dBm)	WCDMA V			Tune-up Limit (dBm)
	TX Channel	9262	9400		9538	1312	1413		1513	4132	4182	
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	22.81	22.88	22.85	24.00	22.46	22.85	22.86	24.00	22.94	23.04	23.01	24.00
3GPP Rel 99 AMR 12.2Kbps	22.52	22.89	22.88	24.00	22.45	22.89	22.87	24.00	22.99	23.65	23.04	24.00
3GPP Rel 6 HSDPA Subtest-1	21.58	21.69	21.66	23.00	21.44	21.24	21.32	23.00	21.95	21.79	21.82	23.00
3GPP Rel 6 HSDPA Subtest-2	21.59	21.58	21.85	23.00	21.41	21.56	21.26	23.00	21.88	21.82	21.83	23.00
3GPP Rel 6 HSDPA Subtest-3	21.06	21.11	21.20	22.50	20.87	20.75	20.79	22.50	21.40	21.34	21.35	22.50
3GPP Rel 6 HSDPA Subtest-4	21.07	21.04	21.14	22.50	20.87	21.00	20.80	22.50	21.41	21.35	21.33	22.50
3GPP Rel 6 DC-HSDPA Subtest-1	21.55	21.68	21.62	23.00	21.41	21.34	21.31	23.00	21.93	21.78	21.79	23.00
3GPP Rel 6 DC-HSDPA Subtest-2	21.56	21.57	21.61	23.00	21.38	21.54	21.25	23.00	21.86	21.81	21.80	23.00
3GPP Rel 6 DC-HSDPA Subtest-3	21.03	21.10	21.16	22.50	20.84	21.00	20.78	22.50	21.38	21.33	21.32	22.50
3GPP Rel 6 DC-HSDPA Subtest-4	21.04	21.03	21.10	22.50	20.84	20.98	20.79	22.50	21.39	21.34	21.30	22.50
3GPP Rel 6 HSUPA Subtest-1	21.69	21.51	21.39	23.00	21.53	21.40	21.41	23.00	22.03	22.02	21.81	23.00
3GPP Rel 6 HSUPA Subtest-2	19.78	19.53	19.51	21.00	19.56	19.43	19.52	21.00	20.01	19.90	19.97	21.00
3GPP Rel 6 HSUPA Subtest-3	20.67	20.54	20.34	22.00	20.55	20.41	20.50	22.00	20.81	20.78	20.71	22.00
3GPP Rel 6 HSUPA Subtest-4	19.82	19.51	19.51	21.00	19.55	19.43	19.48	21.00	19.92	19.79	19.79	21.00
3GPP Rel 6 HSUPA Subtest-5	21.70	21.68	21.56	23.00	21.54	21.47	21.58	23.00	22.03	21.92	21.90	23.00
3GPP Rel 7 HSPA+ (16QAM) Subtest-1	19.77	19.80	19.78	20.50	20.01	19.85	19.90	20.50	19.84	20.02	19.92	20.50



Band 2 (1900MHz Band) Part 24E										
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	22.56	22.77	22.94				
20	QPSK	1	49	22.66	22.67	22.72			24	0
20	QPSK	1	99	22.39	22.41	22.65				
20	QPSK	50	0	21.50	21.98	21.84				
20	QPSK	50	24	21.65	21.91	21.71			23	1
20	QPSK	50	50	21.65	21.92	21.63				
20	QPSK	100	0	21.57	21.90	21.73				
20	16QAM	1	0	21.50	21.73	21.80				
20	16QAM	1	49	21.84	21.78	21.88			23	1
20	16QAM	1	99	21.56	21.73	21.47				
20	16QAM	50	0	20.47	20.96	20.80				
20	16QAM	50	24	20.62	20.89	20.67			22	2
20	16QAM	50	50	20.62	20.84	20.60				
20	16QAM	100	0	20.54	20.92	20.68				
20	64QAM	1	0	20.53	20.85	20.69				
20	64QAM	1	49	20.69	20.80	20.89			22	2
20	64QAM	1	99	20.77	20.85	20.82				
20	64QAM	50	0	19.71	20.20	20.02				
20	64QAM	50	24	19.83	20.13	19.88			21	3
20	64QAM	50	50	19.86	20.08	19.81				
20	64QAM	100	0	19.79	20.14	19.82				
Channel										
Frequency (MHz)										
15	QPSK	1	0	22.37	22.64	22.51			24	0
15	QPSK	1	37	22.66	22.56	22.76				
15	QPSK	1	74	22.47	22.59	22.44				
15	QPSK	36	0	21.50	21.92	21.70				
15	QPSK	36	20	21.63	21.91	21.68			23	1
15	QPSK	36	39	21.63	21.87	21.66				
15	QPSK	75	0	21.57	21.90	21.64				
15	16QAM	1	0	21.56	22.03	21.71			23	1
15	16QAM	1	37	21.65	21.84	21.91				
15	16QAM	1	74	21.79	21.84	21.72				
15	16QAM	36	0	20.44	20.87	20.66				
15	16QAM	36	20	20.57	20.86	20.82			22	2
15	16QAM	36	39	20.58	20.82	20.59				
15	16QAM	75	0	20.54	20.89	20.63				
15	64QAM	1	0	20.75	21.07	20.81			22	2
15	64QAM	1	37	21.05	20.89	21.16				
15	64QAM	1	74	20.87	21.01	20.83				
15	64QAM	36	0	19.89	20.80	19.89				
15	64QAM	36	20	19.81	20.06	19.86			21	3
15	64QAM	36	39	19.81	20.07	19.82				
15	64QAM	75	0	19.79	20.11	19.85				
Channel										
Frequency (MHz)										
10	QPSK	1	0	22.45	22.45	22.80			24	0
10	QPSK	1	25	22.57	22.56	22.72				
10	QPSK	1	49	22.53	22.70	22.53				
10	QPSK	25	0	21.49	21.92	21.66			23	1
10	QPSK	25	12	21.57	21.90	21.64				
10	QPSK	25	25	21.55	21.84	21.66				
10	QPSK	50	0	21.53	21.90	21.65				
10	16QAM	1	0	21.75	22.06	21.80			23	1
10	16QAM	1	25	21.80	22.23	21.80				
10	16QAM	1	49	21.80	21.93	21.77				
10	16QAM	25	0	20.48	20.89	20.64			22	2
10	16QAM	25	12	20.57	20.88	20.62				
10	16QAM	25	25	20.56	20.83	20.58				
10	16QAM	50	0	20.53	20.86	20.60				
10	64QAM	1	0	20.71	21.19	20.94			22	2
10	64QAM	1	25	20.82	21.00	20.93				
10	64QAM	1	49	20.92	21.12	20.91				
10	64QAM	25	0	19.71	20.12	19.87				
10	64QAM	25	12	19.78	20.11	19.86			21	3
10	64QAM	25	25	19.79	20.05	19.85				
10	64QAM	50	0	19.73	20.09	19.83				
Channel										
Frequency (MHz)										
5	QPSK	1	0	22.39	22.71	22.51			24	0
5	QPSK	1	12	22.62	22.67	22.62				
5	QPSK	1	24	22.36	22.68	22.45				
5	QPSK	12	0	21.50	21.86	21.59				
5	QPSK	12	7	21.53	21.89	21.67			23	1
5	QPSK	12	13	21.50	21.83	21.59				
5	QPSK	25	0	21.51	21.88	21.62				
5	16QAM	1	0	21.77	21.66	21.69			23	1
5	16QAM	1	12	21.93	21.76	21.94				
5	16QAM	1	24	21.50	21.97	21.67				
5	16QAM	12	0	20.44	20.85	20.56				
5	16QAM	12	7	20.53	20.86	20.61			22	2
5	16QAM	12	13	20.48	20.77	20.54				
5	16QAM	25	0	20.51	20.84	20.59				
5	64QAM	1	0	20.78	21.12	20.83			22	2
5	64QAM	1	12	21.02	20.91	21.19				
5	64QAM	1	24	20.73	21.10	20.77				
5	64QAM	12	0	19.65	20.04	19.77				
5	64QAM	12	7	19.70	20.08	19.82			21	3
5	64QAM	12	13	19.70	20.01	19.75				
5	64QAM	25	0	19.73	20.08	19.82				
Channel										
Frequency (MHz)										
3	QPSK	1	0	22.45	22.64	22.63			24	0
3	QPSK	1	4	22.46	22.56	22.59				
3	QPSK	1	14	22.43	22.56	22.55				
3	QPSK	8	0	21.50	21.86	21.61			23	1
3	QPSK	8	4	21.51	21.87	21.64				
3	QPSK	8	7	21.50	21.83	21.59				
3	QPSK	15	0	21.49	21.85	21.61				
3	16QAM	1	0	21.67	22.05	21.73			23	1
3	16QAM	1	8	21.72	22.00	21.78				
3	16QAM	1	14	21.67	21.99	21.75				
3	16QAM	8	0	20.54	20.88	20.66			22	2
3	16QAM	8	4	20.55	20.93	20.64				
3	16QAM	8	7	20.53	20.85	20.62				
3	64QAM	1	0	20.49	20.85	20.58				
3	64QAM	1	0	20.81	20.89	20.92				
3	64QAM	1	8	20.71	21.19	20.89			22	2
3	64QAM	1	14	20.82	21.16	20.94				
3	64QAM	8	0	19.76	20.12	19.88				
3	64QAM	8	4	19.75	20.10	19.83			21	3
3	64QAM	8	7	19.78	20.05	19.80				
3	64QAM	15	0	19.71	20.03	19.80				
Channel										
Frequency (MHz)										
1.4	QPSK	1	0	22.42	22.54	22.65			24	0
1.4	QPSK	1	3	22.56	22.55	22.67				
1.4	QPSK	1	5	22.42	22.55	22.53				
1.4	QPSK	3	0	22.56	22.54	22.74				
1.4	QPSK	3	1	22.58	22.56	22.82				
1.4	QPSK	3	3	22.55	22.55	22.64			23	1
1.4	QPSK	6	0	21.53	21.90	21.68				
1.4	16QAM	1	0	21.66	21.97	21.70				
1.4	16QAM	1	3	21.71	22.11	21.82				
1.4	16QAM	1	5	21.71	22.06	21.72			23	1
1.4	16QAM	3	0	21.49	21.83	21.66				
1.4	16QAM	3	1	21.50	21.95	21.69				
1.4	16QAM	3	3	21.50	21.80	21.58			22	2
1.4	16QAM	6	0	20.60	20.95	20.76				
1.4	64QAM	1	0	20.79	20.89	20.92				
1.4	64QAM	1	3	20.81	20.80	21.01				
1.4	64QAM	1	5	20.69	20.91	20.85			22	2
1.4	64QAM	3	0	20.78	21.13	20.88				
1.4	64QAM	3	1	20.81	21.15	20.97				
1.4	64QAM	3	3	20.78	21.15	20.84				
1.4	64QAM	6	0	19.76	20.14	19.89			21	3

Band 4 (AWS Band) Part 27L (only on channel required)										
BW (MHz)	Modulation	RB Size	RB Offset	Power Low Ch						



Band 7 (2600MHz 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				20550	21100	21550			
Frequency (MHz)				2510	2535	2560			
20	QPSK	1	0	22.53	22.66	22.62			
20	QPSK	1	49	22.65	22.39	22.48	24	0	
20	QPSK	1	99	22.48	22.80	22.48			
20	QPSK	50	0	21.51	21.91	21.77			
20	QPSK	50	24	21.67	21.88	21.81	23	1	
20	QPSK	50	50	21.74	21.90	21.76			
20	QPSK	100	0	21.61	21.86	21.79			
20	16QAM	1	0	21.73	21.77	21.85			
20	16QAM	1	49	21.90	22.01	22.05	23	1	
20	16QAM	1	99	21.77	21.82	21.70			
20	16QAM	50	0	20.48	20.81	20.74			
20	16QAM	50	24	20.66	20.88	20.78	22	2	
20	16QAM	50	50	20.70	20.87	20.77			
20	16QAM	100	0	20.55	20.83	20.76			
20	64QAM	1	0	20.77	20.87	20.72			
20	64QAM	1	49	21.00	20.87	21.08	22	2	
20	64QAM	1	99	20.76	20.97	20.87			
20	64QAM	50	0	19.88	20.06	19.95			
20	64QAM	50	24	19.89	20.08	20.01	21	3	
20	64QAM	50	50	19.94	20.09	19.99			
20	64QAM	100	0	19.81	20.06	20.00			
Channel				20625	21100	21575			
Frequency (MHz)				2507.5	2555	2592.5			
15	QPSK	1	0	22.30	22.65	22.62	24	0	
15	QPSK	1	37	22.32	22.52	22.60			
15	QPSK	1	74	22.60	22.50	22.29			
15	QPSK	36	0	21.49	21.79	21.75	23	1	
15	QPSK	36	20	21.63	21.86	21.84			
15	QPSK	36	39	21.68	21.91	21.83			
15	QPSK	75	0	21.58	21.84	21.81			
15	16QAM	1	0	21.50	21.95	21.84	23	1	
15	16QAM	1	37	21.97	21.90	21.96			
15	16QAM	1	74	21.80	21.87	21.98			
15	16QAM	36	0	20.45	20.77	20.71			
15	16QAM	36	20	20.59	20.81	20.77	22	2	
15	16QAM	36	39	20.84	20.84	20.78			
15	16QAM	75	0	20.55	20.81	20.80			
15	64QAM	1	0	20.68	20.98	21.03	22	2	
15	64QAM	1	37	21.04	21.07	21.13			
15	64QAM	1	74	20.96	21.16	21.07			
15	64QAM	36	0	19.98	19.97	19.95			
15	64QAM	36	20	19.81	20.03	20.02	21	3	
15	64QAM	36	39	19.86	20.07	20.02			
15	64QAM	75	0	19.79	20.06	20.02			
Channel				20600	21100	21400			
Frequency (MHz)				2505	2535	2565			
10	QPSK	1	0	22.41	22.50	22.38	24	0	
10	QPSK	1	25	22.62	22.52	22.48			
10	QPSK	1	49	22.56	22.50	22.38			
10	QPSK	25	0	21.47	21.62	21.86	23	1	
10	QPSK	25	12	21.55	21.88	21.87			
10	QPSK	25	25	21.60	21.85	21.90			
10	QPSK	50	0	21.51	21.86	21.91			
10	16QAM	1	0	21.99	22.08	21.97	23	1	
10	16QAM	1	25	21.88	22.03	22.06			
10	16QAM	1	49	21.91	21.94	22.01			
10	16QAM	25	0	20.46	20.84	20.83	22	2	
10	16QAM	25	12	20.57	20.89	20.86			
10	16QAM	25	25	20.60	20.84	20.91			
10	16QAM	50	0	20.51	20.85	20.85			
10	64QAM	1	0	20.76	21.19	21.07	22	2	
10	64QAM	1	25	20.97	21.24	21.19			
10	64QAM	1	49	20.85	21.23	21.16			
10	64QAM	25	0	19.69	20.05	20.06	21	3	
10	64QAM	25	12	19.79	20.10	20.09			
10	64QAM	25	25	19.63	20.08	20.13			
10	64QAM	50	0	19.74	20.08	20.12			
Channel				20775	21100	21425			
Frequency (MHz)				2502.5	2535	2567.5			
5	QPSK	1	0	22.29	22.65	22.48	24	0	
5	QPSK	1	12	22.64	22.61	22.29			
5	QPSK	1	24	22.39	22.31	22.44			
5	QPSK	12	0	21.41	21.76	21.84	23	1	
5	QPSK	12	7	21.49	21.86	21.88			
5	QPSK	12	13	21.49	21.80	21.63			
5	QPSK	25	0	21.47	21.81	21.85	23	1	
5	16QAM	1	0	21.59	21.87	21.85			
5	16QAM	1	12	21.88	21.72	21.86	23	1	
5	16QAM	1	24	21.61	21.90	21.67			
5	16QAM	12	0	20.39	20.74	20.60	22	2	
5	16QAM	12	7	20.47	20.85	20.67			
5	16QAM	12	13	20.48	20.75	20.57			
5	16QAM	25	0	20.49	20.79	20.64			
5	64QAM	1	0	20.96	21.04	20.85	22	2	
5	64QAM	1	12	20.95	21.29	21.03			
5	64QAM	1	24	20.87	21.07	20.85			
5	64QAM	12	0	19.59	19.95	19.80	21	3	
5	64QAM	12	7	19.68	20.05	19.89			
5	64QAM	12	13	19.68	19.98	19.79			
5	64QAM	25	0	19.70	20.02	19.89			

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				130072	130322	130572			
Frequency (MHz)				1720	1745	1770			
20	QPSK	1	0	22.45	22.72	22.65			
20	QPSK	1	49	22.34	22.45	22.32	24	0	
20	QPSK	1	99	22.38	22.48	22.32			
20	QPSK	50	0	21.38	21.86	21.85			
20	QPSK	50	24	21.53	21.84	21.74	23	1	
20	QPSK	50	50	21.56	21.75	21.74			
20	QPSK	100	0	21.50	21.80	21.78			
20	16QAM	1	0	21.33	21.75	21.35			
20	16QAM	1	49	21.45	21.67	21.56	23	1	
20	16QAM	1	99	21.71	21.66	21.59			
20	16QAM	50	0	20.38	20.82	20.59			
20	16QAM	50	24	20.54	20.81	20.62	22	2	
20	16QAM	50	50	20.61	20.73	20.56			
20	16QAM	100	0	20.46	20.76	20.62			
20	64QAM	1	0	20.45	20.76	20.57			
20	64QAM	1	49	20.69	20.69	20.68	22	2	
20	64QAM	1	99	20.79	20.58	20.70			
20	64QAM	50	0	19.61	20.03	19.82			
20	64QAM	50	24	19.74	20.02	19.90	21	3	
20	64QAM	50	50	19.82	19.95	19.82			
20	64QAM	100	0	19.72	20.00	19.83			
Channel				130247	130322	130597			
Frequency (MHz)				1717.5	1745	1772.5			
15	QPSK	1	0	22.45	22.65	22.44	24	0	
15	QPSK	1	37	22.45	22.38	22.45			
15	QPSK	1	74	22.23	22.45	22.51			
15	QPSK	36	0	21.23	21.31	21.66	23	1	
15	QPSK	36	20	21.22	21.31	21.68			
15	QPSK	36	39	21.23	21.25	21.66			
15	QPSK	75	0	21.22	21.26	21.63			
15	16QAM	1	0	21.33	21.49	21.67	23	1	
15	16QAM	1	37	21.56	21.67	21.56			
15	16QAM	1	74	21.55	21.47	21.76			
15	16QAM	36	0	20.29	20.27	20.61			
15	16QAM	36	20	20.41	20.28	20.63	22	2	
15	16QAM	36	39	20.46	20.20	20.60			
15	16QAM	75	0	20.40	20.26	20.62			
15	64QAM	1	0	20.48	20.55	20.72	22	2	
15	64QAM	1	37	20.88	20.80	20.80			
15	64QAM	1	74	20.80	20.51	20.93			
15	64QAM	36	0	19.51	19.51	19.89	21	3	
15	64QAM	36	20	19.65	19.50	19.88			
15	64QAM	36	39	19.71	19.45	19.83			
15	64QAM	75	0	19.63					



Power Level for Receiver off

GSM850 TX Channel Frequency (MHz)	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame Average Power (dBm)			Tune-up Limit (dBm)
	176	189	251		128	169	251	
	824.2	836.4	848.8		824.2	836.4	848.8	
GSM 1 Tx slot	32.36	32.39	32.32	33.50	23.36	23.39	23.32	24.50
GPRS 1 Tx slot	32.35	32.38	32.30	33.50	23.35	23.38	23.30	24.50
GPRS 3 Tx slots	31.57	31.60	31.51	32.50	25.57	25.60	25.51	26.50
GPRS 4 Tx slots	29.85	29.85	29.75	30.50	25.59	25.59	25.49	26.24
GPRS 4 Tx slots	28.68	28.69	28.59	29.50	25.68	25.69	25.59	26.50
EDGE 1 Tx slot	26.67	26.65	26.41	27.50	17.67	17.65	17.41	18.50
EDGE 2 Tx slots	25.41	25.34	25.16	26.50	19.41	19.34	19.16	20.50
EDGE 3 Tx slots	23.01	22.99	22.66	23.50	18.75	18.64	18.40	19.24
EDGE 4 Tx slots	21.81	21.71	21.45	22.50	18.81	18.71	18.45	19.50

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	1880	1909.8		1850.2	1880	1909.8	
GSM 1 Tx slot	27.06	27.15	27.14	28.00	18.06	18.15	18.14	19.00
GPRS 1 Tx slot	27.12	27.16	27.15	28.00	18.12	18.16	18.15	19.00
GPRS 2 Tx slots	26.19	26.22	26.24	27.00	20.19	20.22	20.24	21.00
GPRS 3 Tx slots	24.17	24.21	24.28	25.00	19.91	19.95	20.02	20.74
GPRS 4 Tx slots	23.09	23.14	23.22	24.00	20.09	20.14	20.22	21.00
EDGE 1 Tx slot	22.56	22.97	22.91	24.00	13.56	13.97	13.91	15.00
EDGE 2 Tx slots	21.56	21.97	21.96	22.50	15.56	15.97	15.96	16.50
EDGE 3 Tx slots	19.57	20.02	19.93	20.50	15.31	15.76	15.67	16.24
EDGE 4 Tx slots	18.84	18.93	18.91	19.50	15.84	15.93	15.91	16.50

Band TX Channel Rx Channel Frequency (MHz)	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		
	9682	9800	9938		1337	1638	1738		4357	4407	4458		
3GPP Rel 99	1932.4	1980	1997.6		1712.4	1723.6	1723.3		2304	2304	2316		
3GPP Rel 99	AMR 12.2Kbps	16.90	17.03	16.91	18.50	14.80	15.05	14.94	16.50	22.94	23.04	23.01	24.00
3GPP Rel 99	RMC 12.2Kbps	17.02	17.05	16.99	18.50	14.81	15.06	15.04	16.50	22.96	23.05	23.04	24.00
3GPP Rel 6	HSDPA Subtest-1	16.00	15.91	15.99	17.50	13.95	14.02	14.13	15.50	21.95	21.79	21.82	23.00
3GPP Rel 6	HSDPA Subtest-2	15.97	15.83	15.94	17.50	13.93	13.96	14.02	15.50	21.88	21.82	21.83	23.00
3GPP Rel 6	HSDPA Subtest-3	15.51	15.48	15.46	17.00	13.48	13.53	13.62	15.00	21.40	21.34	21.35	22.50
3GPP Rel 6	HSDPA Subtest-4	15.54	15.45	15.44	17.00	13.46	13.48	13.74	15.00	21.41	21.35	21.33	22.50
3GPP Rel 8	DCHSDPA Subtest-1	15.92	15.93	15.99	17.50	13.94	14.03	14.13	15.50	21.93	21.78	21.79	23.00
3GPP Rel 8	DCHSDPA Subtest-2	16.03	15.81	15.93	17.50	13.93	13.90	14.12	15.50	21.86	21.81	21.80	23.00
3GPP Rel 8	DCHSDPA Subtest-3	15.55	15.41	15.48	17.00	13.47	13.50	13.52	15.00	21.38	21.33	21.32	22.50
3GPP Rel 8	DCHSDPA Subtest-4	15.54	15.46	15.52	17.00	13.52	13.54	13.61	15.00	21.39	21.34	21.30	22.50
3GPP Rel 6	HSUPA Subtest-1	15.92	15.91	16.03	17.50	13.99	14.02	14.00	15.50	22.03	22.02	21.81	23.00
3GPP Rel 6	HSUPA Subtest-2	14.11	14.05	14.18	15.50	12.29	12.34	12.25	13.50	20.01	19.90	19.87	21.00
3GPP Rel 6	HSUPA Subtest-3	15.18	15.03	14.98	16.50	13.22	13.30	13.27	14.50	20.81	20.78	20.71	22.00
3GPP Rel 6	HSUPA Subtest-4	14.11	14.18	14.21	15.50	12.38	12.25	12.30	13.50	19.92	19.79	19.79	21.00
3GPP Rel 6	HSUPA Subtest-5	15.80	15.70	15.70	17.50	13.99	13.89	13.89	15.50	22.03	21.92	21.90	23.00
3GPP Rel 7	HSPA+ (16QAM) Subtest-1	14.34	14.46	14.30	15.00	12.44	12.47	12.41	13.00	19.84	20.02	19.92	20.50



Band 2 (1900MHz Band)										
Part 24E										
BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch./Freq.	Power High Ch./Freq.	Power High 19100	Tune-up limit (dBm)	MPR (dB)		
Channel										
Frequency (MHz)										
20	QPSK	1	0	17.95	17.95	17.95				
20	QPSK	1	49	17.41	17.41	17.41	19	0		
20	QPSK	1	99	17.00	17.02	17.01				
20	QPSK	50	0	16.21	16.42	16.40				
20	QPSK	50	24	16.32	16.34	16.34	18	1		
20	QPSK	50	50	16.27	16.38	16.28				
20	QPSK	100	0	16.22	16.38	16.33				
20	16QAM	1	0	16.31	16.40	16.39				
20	16QAM	1	49	16.79	16.78	16.82	18	1		
20	16QAM	50	0	14.32	14.47	14.42				
20	16QAM	50	0	15.38	15.50	15.45				
20	16QAM	50	24	15.43	15.39	15.42	17	2		
20	16QAM	50	50	15.36	15.42	15.34				
20	16QAM	100	0	15.33	15.47	15.37				
20	64QAM	1	0	15.42	15.29	15.32				
20	64QAM	1	49	15.45	15.64	15.45	17	2		
20	64QAM	1	99	15.22	15.25	15.22				
20	64QAM	50	0	14.32	14.47	14.42				
20	64QAM	50	0	14.44	14.41	14.36	16	3		
20	64QAM	50	24	14.35	14.39	14.31				
20	64QAM	100	0	14.28	14.40	14.37				
Channel										
Frequency (MHz)										
15	QPSK	1	0	17.09	17.08	17.09	19	0		
15	QPSK	1	37	17.01	17.39	17.38				
15	QPSK	1	74	17.14	17.07	17.11				
15	QPSK	36	0	16.22	16.28	16.28	18	1		
15	QPSK	36	20	16.31	16.25	16.28				
15	QPSK	36	39	16.27	16.20	16.26				
15	QPSK	75	0	16.28	16.24	16.25				
15	16QAM	1	0	16.48	16.44	16.45	18	1		
15	16QAM	1	37	16.61	16.74	16.66				
15	16QAM	1	74	16.52	16.54	16.61				
15	16QAM	36	0	15.27	15.33	15.33	17	2		
15	16QAM	36	20	15.36	15.29	15.36				
15	16QAM	36	39	15.31	15.26	15.31				
15	16QAM	75	0	15.38	15.32	15.38				
15	64QAM	1	0	15.52	15.43	15.35	17	2		
15	64QAM	1	37	15.71	15.60	15.54				
15	64QAM	1	74	15.38	15.40	15.38				
15	64QAM	36	0	14.28	14.29	14.30	16	3		
15	64QAM	36	20	14.35	14.30	14.29				
15	64QAM	36	39	14.25	14.25	14.24				
15	64QAM	75	0	14.29	14.28	14.27				
Channel										
Frequency (MHz)										
10	QPSK	1	0	17.15	17.18	17.15	19	0		
10	QPSK	1	25	17.34	17.29	17.23				
10	QPSK	1	49	17.18	17.09	17.16				
10	QPSK	25	0	16.17	16.22	16.20	18	1		
10	QPSK	25	12	16.23	16.16	16.17				
10	QPSK	25	25	16.25	16.11	16.21				
10	QPSK	50	0	16.25	16.16	16.21	18	1		
10	16QAM	1	0	16.44	16.41	16.42	17	2		
10	16QAM	1	25	16.60	16.60	16.59				
10	16QAM	1	49	16.55	16.44	16.49	17	2		
10	16QAM	25	0	15.21	15.30	15.31				
10	16QAM	25	12	15.29	15.21	15.28				
10	16QAM	25	25	15.34	15.20	15.31				
10	16QAM	50	0	15.29	15.24	15.29	17	2		
10	64QAM	1	0	15.47	15.38	15.41	17	2		
10	64QAM	1	25	15.05	15.42	15.48				
10	64QAM	1	49	15.47	15.43	15.41				
10	64QAM	25	0	14.21	14.26	14.28	16	3		
10	64QAM	25	12	14.25	14.21	14.21				
10	64QAM	25	25	14.32	14.19	14.28				
10	64QAM	50	0	14.27	14.18	14.28				
Channel										
Frequency (MHz)										
5	QPSK	1	0	17.11	17.06	17.32	19	0		
5	QPSK	1	12	17.23	17.28	17.34				
5	QPSK	1	24	17.32	17.22	17.01				
5	QPSK	12	0	16.16	16.19	16.33	18	1		
5	QPSK	12	7	16.20	16.17	16.34				
5	QPSK	12	13	16.34	16.11	16.14				
5	QPSK	25	0	16.62	16.12	16.21	18	1		
5	16QAM	1	0	16.48	16.45	16.17				
5	16QAM	1	12	16.34	16.67	16.14	18	1		
5	16QAM	1	24	16.43	16.23	16.34				
5	16QAM	12	0	15.45	15.28	15.45	17	2		
5	16QAM	12	7	15.27	15.29	15.30				
5	16QAM	12	13	15.28	15.22	15.22				
5	16QAM	25	0	15.63	15.23	15.27	17	2		
5	64QAM	1	0	15.37	15.29	15.23				
5	64QAM	1	12	15.32	15.44	15.28	17	2		
5	64QAM	1	24	15.33	15.30	15.33				
5	64QAM	12	0	14.24	14.34	14.23	16	3		
5	64QAM	12	7	14.31	14.28	14.28				
5	64QAM	12	13	14.32	14.22	14.23				
5	64QAM	25	0	14.23	14.32	14.23				
Channel										
Frequency (MHz)										
3	QPSK	1	0	17.14	17.12	17.16	19	0		
3	QPSK	1	8	17.32	17.09	17.21				
3	QPSK	1	14	17.22	17.23	17.13				
3	QPSK	8	0	16.14	16.14	16.12	18	1		
3	QPSK	8	7	16.09	16.11	16.16				
3	QPSK	8	14	16.28	16.28	16.15				
3	QPSK	15	0	16.26	16.68	16.16	18	1		
3	16QAM	1	0	16.45	16.45	16.47	18	1		
3	16QAM	1	8	16.45	16.50	16.82				
3	16QAM	1	14	16.54	16.55	16.27				
3	16QAM	8	0	15.28	15.32	15.22	17	2		
3	16QAM	8	4	15.18	15.24	15.34				
3	16QAM	8	7	15.33	15.19	15.29				
3	16QAM	15	0	15.38	15.41	15.23	17	2		
3	64QAM	1	8	15.32	15.42	15.34	17	2		
3	64QAM	1	14	15.23	15.22	15.42				
3	64QAM	8	0	14.20	14.43	14.22	16	3		
3	64QAM	8	4	14.15	14.21	14.25				
3	64QAM	8	7	14.10	14.10	14.34				
3	64QAM	15	0	14.45	14.23	14.33				
Channel										
Frequency (MHz)										
1.4	QPSK	1	0	17.07	17.10	17.13	19	0		
1.4	QPSK	1	3	17.17	17.25	17.25				
1.4	QPSK	1	5	17.10	17.07	17.13				
1.4	QPSK	3	0	17.19	17.17	17.21	18	1		
1.4	QPSK	3	1	17.29	17.23	17.27				
1.4	QPSK	3	3	17.21	17.20	17.25				
1.4	QPSK	6	0	16.13	16.14	16.21	18	1		
1.4	16QAM	1	0	16.37	16.39	16.45	18	1		
1.4	16QAM	1	3	16.80	16.48	16.54				
1.4	16QAM	1	5	16.39	16.43	16.38	18	1		
1.4	16QAM	3	0	16.14	16.16	16.23				
1.4	16QAM	3	1	16.31	16.19	16.30				
1.4	16QAM	3	3	16.15	16.22	16.21	17	2		
1.4	64QAM	1	0	15.33	15.34	15.30				
1.4	64QAM	1	0	15.25	15.24	15.36				
1.4	64QAM	1	3	15.38	15.53	15.53				
1.4	64QAM	1	5	15.28	15.29	15.44	17	2		
1.4	64QAM	3	0	15.33	15.28	15.38				
1.4	64QAM	3	1	15.30	15.38	15.38				
1.4	64QAM	3	3	15.32	15.30	15.38				
1.4	64QAM	6	0	14.21	14.18	14.18	16	3		

Band 4 (AWS Band)										
Part 27L (only on channel required)										
BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch./Freq.	Power High Ch./Freq.	Power High 20300	Tune-up limit (dBm)	MPR (dB)		
Channel										
Frequency (MHz)										
20	QPSK	1	0	17.20	17.22	17.45				
20	QPSK	1	49	15.23	15.21	15.40	17	0		
20	QPSK	1	99	15.33	15.32	15.25				
20	QPSK	50	0	14.12	14.34	14.31				
20	QPSK	50	24	14.19	14.28	14.33	16	1		
20	QPSK	50	50	14.16	14.23	14.26				
20	QPSK	100	0	14.16	14.30	14.29				
20	16QAM	1	0	14.30	14.37	14.27				
20	16QAM	1	49	14.55	14.85	14.89	16	1		
20	16QAM	50	0	13.16	13.22	13.36				
20	16QAM	50	0	13.16	13.29	13.32				
20	16QAM	50	24	13.24	13.28	13.30	15	2		
20	16QAM	50	50	13.17	13.27	13.28				
20	16QAM	100	0	13.18	13.26	13.26				
20	64QAM	1	0	13.18	13.12	13.22				
20	64QAM	1	49	13.21	13.23	13.52	15	2		
20	64QAM	1	99	13.23	13.15	13.21				
20	64QAM	50	0	12.21	12.32	12.36				
20	64QAM	50	24	12.27	12.34	12.36	14	3		



Band 7 (2600MHz 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				20850	21100	21350			
Frequency (MHz)				2310	2335	2360			
20	QPSK	1	0	17.53	17.58	17.56	19	0	
20	QPSK	1	49	17.32	17.15	17.35			
20	QPSK	1	99	17.44	17.42	17.53			
20	QPSK	50	0	16.10	16.25	16.16			
20	QPSK	50	24	16.15	16.06	16.22	18	1	
20	QPSK	50	50	16.17	16.00	16.19			
20	QPSK	100	0	16.17	16.20	16.15			
20	16QAM	1	0	16.35	16.35	16.25			
20	16QAM	1	49	16.66	16.38	16.71	18	1	
20	16QAM	50	0	14.20	14.10	14.22			
20	16QAM	50	0	15.18	15.13	15.23			
20	16QAM	50	24	15.28	15.14	15.31			
20	16QAM	50	50	15.27	15.07	15.27	17	2	
20	16QAM	100	0	15.25	15.10	15.24			
20	16QAM	1	0	15.22	15.06	15.07			
20	16QAM	1	49	15.50	15.30	15.45	17	2	
20	16QAM	1	99	15.23	15.02	15.06			
20	16QAM	50	0	14.20	14.10	14.22			
20	16QAM	50	24	14.19	14.08	14.21			
20	16QAM	50	50	14.23	14.07	14.28	16	3	
20	16QAM	100	0	14.20	14.10	14.20			
Channel				20805	21100	21375	Tune-up limit (dBm)	MPR (dB)	
Frequency (MHz)				2507.5	2535	2562.5			
15	QPSK	1	0	17.89	17.35	17.05	19	0	
15	QPSK	1	37	17.33	17.26	17.23			
15	QPSK	1	74	17.33	17.23	17.13			
15	QPSK	36	0	16.17	16.03	16.17			
15	QPSK	36	20	16.18	16.01	16.23	18	1	
15	QPSK	36	39	16.19	16.01	16.22			
15	QPSK	75	0	16.15	16.03	16.19			
15	16QAM	1	0	16.46	16.40	16.49			
15	16QAM	1	37	16.68	16.50	16.77	18	1	
15	16QAM	1	74	16.31	16.27	16.39			
15	16QAM	36	0	15.21	15.08	15.24			
15	16QAM	36	20	15.27	15.09	15.28	17	2	
15	16QAM	36	39	15.20	15.07	15.27			
15	16QAM	75	0	15.28	15.09	15.29			
15	16QAM	1	0	15.33	15.16	15.20			
15	16QAM	1	37	15.53	15.46	15.42	17	2	
15	16QAM	1	74	15.23	15.13	15.33			
15	16QAM	36	0	14.22	14.09	14.24			
15	16QAM	36	20	14.21	14.08	14.28	16	3	
15	16QAM	36	39	14.18	14.01	14.29			
15	16QAM	75	0	14.18	14.02	14.20			
Channel				20800	21100	21400	Tune-up limit (dBm)	MPR (dB)	
Frequency (MHz)				2595	2635	2665			
10	QPSK	1	0	17.17	17.03	17.18	19	0	
10	QPSK	1	25	17.27	17.13	17.37			
10	QPSK	1	49	17.11	16.96	17.23			
10	QPSK	25	0	16.16	16.04	16.22			
10	QPSK	25	12	16.17	16.07	16.26	18	1	
10	QPSK	25	25	16.16	16.03	16.23			
10	QPSK	50	0	16.18	16.02	16.20			
10	16QAM	1	0	16.45	16.45	16.56			
10	16QAM	1	25	16.46	16.53	16.73	18	1	
10	16QAM	1	49	16.31	16.37	16.53			
10	16QAM	25	0	15.23	15.17	15.31			
10	16QAM	25	12	15.29	15.15	15.36	17	2	
10	16QAM	25	25	15.28	15.10	15.33			
10	16QAM	50	0	15.29	15.13	15.29			
10	16QAM	1	0	15.32	15.29	15.36			
10	16QAM	1	25	15.48	15.35	15.48	17	2	
10	16QAM	1	49	15.29	15.19	15.46			
10	16QAM	25	0	14.21	14.14	14.22			
10	16QAM	25	12	14.30	14.10	14.23	16	3	
10	16QAM	25	25	14.32	14.06	14.33			
10	16QAM	50	0	14.21	14.09	14.29			
Channel				20775	21100	21425	Tune-up limit (dBm)	MPR (dB)	
Frequency (MHz)				2592.5	2635	2567.5			
5	QPSK	1	0	17.12	16.91	17.12	19	0	
5	QPSK	1	12	17.22	17.11	17.29			
5	QPSK	1	24	17.04	16.89	17.15			
5	QPSK	12	0	16.18	16.02	16.23			
5	QPSK	12	7	16.18	16.02	16.28	18	1	
5	QPSK	12	13	16.11	15.97	16.23			
5	QPSK	25	0	16.14	15.99	16.24			
5	16QAM	1	0	16.45	16.21	16.38			
5	16QAM	1	12	16.65	16.45	16.53	18	1	
5	16QAM	1	24	16.34	16.19	16.35			
5	16QAM	12	0	15.28	15.02	15.34			
5	16QAM	12	7	15.30	15.07	15.39	17	2	
5	16QAM	12	13	15.20	15.03	15.29			
5	16QAM	25	0	15.25	15.08	15.35			
5	16QAM	1	0	15.36	15.21	15.31			
5	16QAM	1	12	15.55	15.23	15.57	17	2	
5	16QAM	1	24	15.27	15.16	15.41			
5	16QAM	12	0	14.29	14.09	14.27			
5	16QAM	12	7	14.27	14.23	14.32	16	3	
5	16QAM	12	13	14.18	13.99	14.30			
5	16QAM	25	0	14.22	14.22	14.20			

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	15.42	15.36	15.34	17	0	
20	QPSK	1	49	15.09	15.14	15.22			
20	QPSK	1	99	15.42	15.32	15.22			
20	QPSK	50	0	14.21	14.52	14.51			
20	QPSK	50	24	14.26	14.35	14.45	16	1	
20	QPSK	50	50	14.27	14.32	14.31			
20	QPSK	100	0	14.24	14.42	14.39			
20	16QAM	1	0	14.50	14.64	14.55			
20	16QAM	1	49	14.63	14.90	14.97	16	1	
20	16QAM	50	0	13.22	13.55	13.58			
20	16QAM	50	0	13.23	13.41	13.51			
20	16QAM	50	24	13.27	13.34	13.48	15	2	
20	16QAM	50	50	13.30	13.29	13.35			
20	16QAM	100	0	13.25	13.35	13.40			
20	16QAM	1	0	13.54	13.53	13.53			
20	16QAM	1	49	13.56	13.65	13.79	15	2	
20	16QAM	1	99	13.55	13.32	13.34			
20	16QAM	50	0	12.32	12.55	12.58			
20	16QAM	50	24	12.35	12.42	12.56	14	3	
20	16QAM	50	50	12.35	12.38	12.43			
20	16QAM	100	0	12.30	12.44	12.48			
Channel				132047	132322	132597	Tune-up limit (dBm)	MPR (dB)	
Frequency (MHz)				1717.5	1745	1772.5			
15	QPSK	1	0	15.22	15.26	15.36	17	0	
15	QPSK	1	37	15.47	15.52	15.23			
15	QPSK	1	74	15.18	15.34	15.34			
15	QPSK	36	0	14.25	14.39	14.48			
15	QPSK	36	20	14.26	14.41	14.50	16	1	
15	QPSK	36	39	14.31	14.35	14.37			
15	QPSK	75	0	14.25	14.38	14.45			
15	16QAM	1	0	14.48	14.65	14.53			
15	16QAM	1	37	14.77	14.89	14.55	16	1	
15	16QAM	1	74	14.58	14.84	14.84			
15	16QAM	36	0	13.23	13.38	13.46			
15	16QAM	36	20	13.25	13.43	13.44	15	2	
15	16QAM	36	39	13.26	13.36	13.38			
15	16QAM	75	0	13.28	13.36	13.44			
15	16QAM	1	0	13.36	13.50	13.56			
15	16QAM	1	37	13.70	13.69	13.68	15	2	
15	16QAM	1	74	13.41	13.50	13.62			
15	16QAM	36	0	12.35	12.45	12.56			
15	16QAM	36	20	12.41	12.52	12.56	14	3	
15	16QAM	36	39	12.39	12.44	12.42			
15	16QAM	75	0	12.33	12.48	12.50			
Channel				132022	132322	132622	Tune-up limit (dBm)	MPR (dB)	
Frequency (MHz)				1715	1745	1775			
10	QPSK	1	0	15.31	15.36	15.43	17	0	
10	QPSK	1	25	15.35	15.46	15.51			
10	QPSK	1	49	15.29	15.40	15.40			
10	QPSK	25	0	14.22	14.39	14.48			
10	QPSK	25	12	14.27	14.40	14.41	16	1	
10	QPSK	25	25	14.30	14.40	14.44			
10	QPSK	50	0	14.30	14.42	14.34			
10	16QAM	1	0	14.70	14.78	14.79			
10	16QAM	1	25	14.85	14.79	14.91	16	1	
10	16QAM	1	49	14.70	14.69	14.77			
10	16QAM	25	0	13.29	13.42	13.53			
10	16QAM	25	12	13.30	13.41	13.47	15	2	
10	16QAM	25	25	13.32	13.39	13.33			
10	16QAM	50	0	13.28	13.43	13.46			
10	16QAM	1	0	13.38	13.54	13.65			
10	16QAM	1	25	13.54	13.54	13.67	15	2	
10	16QAM	1	49						

2.4GHz WLAN		Ant 1				
2.4GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11b 1Mbps	1	2412	16.63	17.50	100.00
		6	2437	16.83	17.50	
		11	2462	16.59	17.50	
	802.11g 6Mbps	1	2412	16.26	17.50	96.97
		6	2437	16.67	17.50	
		11	2462	16.40	17.50	
	802.11n-HT20 MCS0	1	2412	16.19	17.50	96.24
		6	2437	16.59	17.50	
		11	2462	16.33	17.50	

Bluetooth BR/EDR					
Mode	Channel	Frequency (MHz)	Average power (dBm)		
			1Mbps	2Mbps	3Mbps
BR / EDR	CH 00	2402	9.50	8.12	8.05
	CH 39	2441	10.04	8.30	8.31
	CH 78	2480	10.28	8.71	8.74
Tune-up Limit			11	9.5	9.5

Bluetooth LE 4.0				
Mode	Channel	Frequency (MHz)	Average power (dBm)	
			GFSK	
LE	CH 00	2402	-2.95	
	CH 19	2440	-2.05	
	CH 39	2480	-2.60	
Tune-up Limit			0	

Bluetooth LE 5.0			
Mode	Channel	Frequency (MHz)	Average power (dBm)
			1Mbps
LE	CH 00	2402	-2.94
	CH 19	2440	-2.06
	CH 39	2480	-2.60
Tune-up Limit			0