SIGNAL ANALYSER - RSSL EXPLAINED

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Signal Analyser - RSSL Explained

Guide

Background

RSSL (Relative Signal Strength Level) is a signal strength calculation designed to make it easier for users to understand if the location of their installation is acceptable or not. For performing surveys on 2G (GSM), CSQ was formerly an easy way to measure the signal strength reading. However, this measurement is not consistent across 3G (UMTS) and 4G (LTE) as CSQ does not measure the entire signal strength band. It merely measures a segment of the
band with discounted sections above and below the traditional CSQ. For example: A CSQ of 1 in 4G relates to 3% using old CSQ calculations but is actually 32% of the entire signal strength. In this scenario it is unlikely you would install a device with a perceived value of 3% but possible at 32%.

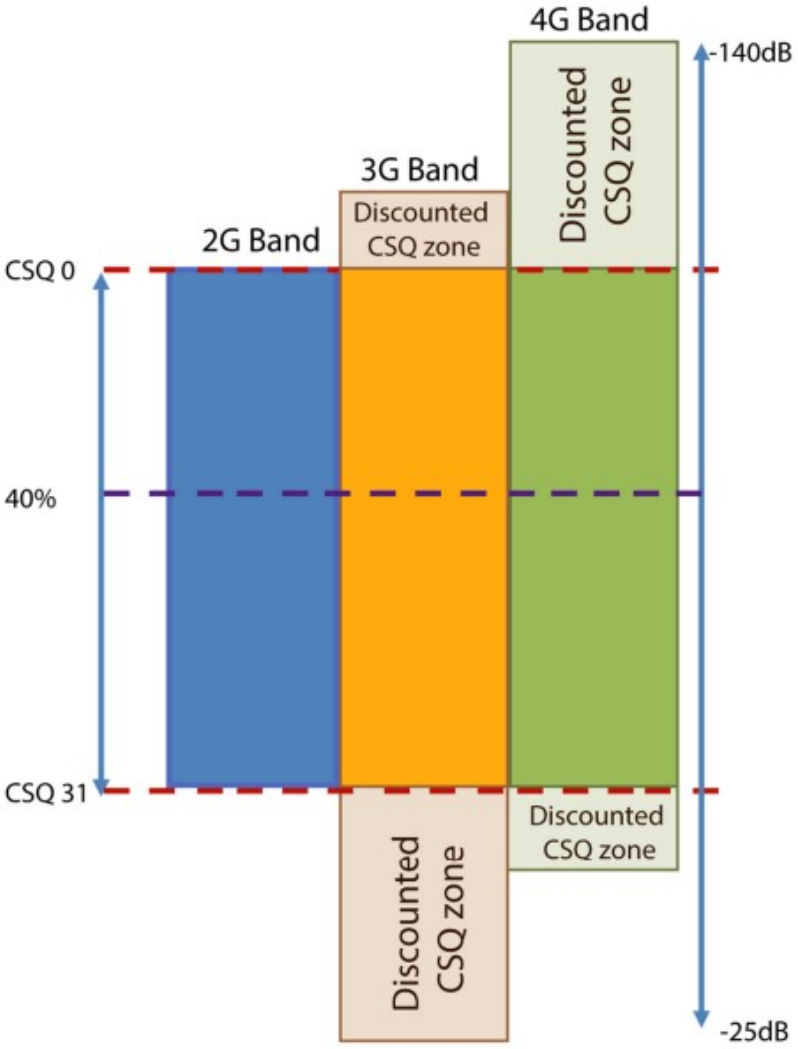
RSSL Explained

To ensure that a consistent approach is used to measure all Radio Access Technologies (RAT) - such as 2G, 3G and 4G - a new, more accurate method for calculating percentage of the signal strength has been introduced. RSSL is not based on CSQ readings provided by the radio module alone but is calculated from the raw data received from the network readings. The value is mapped through the whole range and is independent for each RAT. The value calculation includes both signal strength and signal quality measurements.

What Does This Mean?

- The method for obtaining signal level is technology independent.
- Minimum CSQ required for units to register in 2G, 3G and 4G are different. The standards only specify minimum thresholds of each type of measurement required by the UE to report to the core network. The requirements for data transmission depend on a wide range of factors e.g. indoor/outdoor cell, in urban or remote location, proximity to the base station.
- Percentage representation of CSQ is not relevant, accurate or consistent. Figure 1 depicts the summary of the problem. Clearly using CSQ values omits substantial sections of the 3G and 4G band and what is 40% of the CSQ range in 2G is not equivalent in the other RATs. Achieving the equivalent of 40% CSQ in 2G at the other RATS will be very difficult unless there are strong cells in the neighbourhood.
- It is possible to receive signal levels in the discounted CSQ areas, and in fact the 3GPP specifications clearly indicate that it is possible for 4G to operate below a CSQ of 0.

Figure 1



	2G			3G			4G		
	CSQ Reading	Proposed RSSL (%)	Remark	CSQ Reading	Proposed RSSL (%)	Remark	CSQ Reading	Proposed RSSL (%)	Remark
-140	0	0	Weak	0	0	Weak	0	0	Weak
-139	0	0	Weak	0	0	Weak	0	1	Weak
-138	0	0	Weak	0	0	Weak	0	2	Weak
-137	0	0	Weak	0	0	Weak	0	3	Weak
-136	0	0	Weak	0	0	Weak	0	4	Weak
-135	0	0	Weak	0	0	Weak	0	6	Weak
-134	0	0	Weak	0	0	Weak	0	7	Weak
-133	0	0	Weak	0	0	Weak	0	8	Weak
-132	0	0	Weak	0	0	Weak	0	9	Weak
-131	0	0	Weak	0	0	Weak	0	10	Weak
-130	0	0	Weak	0	0	Weak	0	11	Weak
-129	0	0	Weak	0	0	Weak	0	12	Weak
-128	0	0	Weak	0	0	Weak	0	13	Weak
-127	0	0	Weak	0	0	Weak	0	15	Weak

-126	0	0	Weak	0	0	Weak	0	16	Weak
-125	0	0	Weak	0	0	Weak	0	17	Weak
-124	0	0	Weak	0	0	Weak	0	18	Weak
-123	0	0	Weak	0	0	Weak	0	19	Weak
-122	0	0	Weak	0	0	Weak	0	20	Weak
-121	0	0	Weak	0	0	Weak	0	21	Weak
-120	0	0	Weak	0	0	Weak	0	22	Weak
-119	0	0	Weak	0	2	Weak	0	24	Weak
-118	0	0	Weak	0	3	Weak	0	25	Weak
-117	0	0	Weak	0	5	Weak	0	26	Weak
-116	0	0	Weak	0	6	Weak	0	27	Weak
-115	0	0	Weak	0	8	Weak	0	28	Weak
-114	0	0	Weak	0	9	Weak	0	29	Weak
-113	0	0	Weak	0	11	Weak	0	30	Low
-112	0	2	Weak	0	12	Weak	0	31	Low
-111	1	3	Weak	1	14	Weak	1	32	Low
-110	2	5	Weak	2	15	Weak	2	34	Low
-109	2	7	Weak	2	17	Weak	2	35	Low
-108	3	8	Weak	3	18	Weak	3	36	Low
-107	3	10	Weak	3	20	Weak	3	37	Low
-106	4	12	Weak	4	21	Weak	4	38	Low
-105	4	13	Weak	4	23	Weak	4	39	Low
-104	5	15	Weak	5	24	Weak	5	40	Good
-103	5	16	Weak	5	26	Weak	5	41	Good
-102	6	18	Weak	6	27	Weak	6	43	Good
-101	6	20	Weak	6	29	Weak	6	44	Good
-100	7	21	Weak	7	31	Low	7	45	Good
-99	7	23	Weak	7	32	Low	7	46	Good
-98	8	25	Weak	8	34	Low	8	47	Good
-97	8	26	Weak	8	35	Low	8	48	Good
-96	9	28	Weak	9	37	Low	9	49	Good
-95	9	30	Low	9	38	Low	9	50	Good
-94	10	31	Low	10	40	Good	10	52	Good
-93	10	33	Low	10	41	Good	10	53	Good
-92	11	35	Low	11	43	Good	11	54	Good
-91	11	36	Low	11	44	Good	11	55	Good
-90	12	38	Low	12	46	Good	12	56	Good
-89	12	39	Low	12	47	Good	12	57	Good
-88	13	41	Good	13	49	Good	13	58	Good
-87	13	43	Good	13	50	Good	13	59	Good
-86	14	44	Good	14	52	Good	14	60	Strong
-85	14	46	Good	14	53	Good	14	62	Strong
-84	15	48	Good	15	55	Good	15	63	Strong
-83	15	49	Good	15	56	Good	15	64	Strong
-82	16	51	Good	16	58	Good	16	65	Strong
-81	16	53	Good	16	59	Good	16	66	Strong
-80	17	54	Good	17	61	Strong	17	67	Strong
-79	17	56	Good	17	63	Strong	17	68	Strong
-78	18	58	Good	18	64	Strong	18	69	Strong
-77	18	59	Good	18	66	Strong	18	71	Strong

-76	19	61	Strong	19	67	Strong	19	72	Strong
-75	19	63	Strong	19	69	Strong	19	73	Strong
-74	20	64	Strong	20	70	Strong	20	74	Strong
-73	20	66	Strong	20	72	Strong	20	75	Strong
-72	21	67	Strong	21	73	Strong	21	76	Strong
-71	21	69	Strong	21	75	Strong	21	77	Strong
-70	22	71	Strong	22	76	Strong	22	78	Strong
-69	22	72	Strong	22	78	Strong	22	80	Strong
-68	23	74	Strong	23	79	Strong	23	81	Strong
-67	23	76	Strong	23	81	Strong	23	82	Strong
-66	24	77	Strong	24	82	Strong	24	83	Strong
-65	24	79	Strong	24	84	Strong	24	84	Strong
-64	25	81	Strong	25	85	Strong	25	85	Strong
-63	25	82	Strong	25	87	Strong	25	86	Strong
-62	26	84	Strong	26	88	Strong	26	87	Strong
-61	26	86	Strong	26	90	Strong	26	88	Strong
-60	27	87	Strong	27	92	Strong	27	90	Strong
-59	27	89	Strong	27	93	Strong	27	91	Strong
-58	28	91	Strong	28	95	Strong	28	92	Strong
-57	28	92	Strong	28	96	Strong	28	93	Strong
-56	29	94	Strong	29	98	Strong	29	94	Strong
-55	29	95	Strong	29	99	Strong	29	95	Strong