

RF Power Output and Effective Radiated Power

Mode	Modulation	Sub-carrier spacing (KHz)	Ntones	Conducted Power (dBm) for low/mid/high channel		
				20402/824.2	20525/836.5	20648/848.8
NB-IoT Band 5 Standalone	BPSK	3.75	1@0	23.06	23.23	23.01
			1@47	22.94	23.05	22.86
		15	1@0	23.05	23.26	23.18
			1@11	22.93	23.13	23.14
	QPSK	3.75	1@0	23.01	23.12	23.02
			1@47	22.98	23.06	22.93
		15	1@0	23.06	23.13	23.22
			1@11	23.03	23.09	23.14
		15	12@0	21.04	21.24	21.15

Occupied Bandwidth

Mode	Modulation	Sub-carrier spacing (KHz)	Ntones	Bandwidth(KHz) for low/mid/high channel					
				20402/824.2		20525/836.5		20648/848.8	
				99% Power	-26dBc	99% Power	-26dBc	99% Power	-26dBc
NB-IoT Band 5 Standalone	BPSK	15	1@0	127.07	115.80	127.11	113.60	117.17	102.40



NB-IOT Band 5 BPSK 15kHz 1@0 CH-Low



NB-IOT Band 5 BPSK 15kHz 1@0 CH-Middle

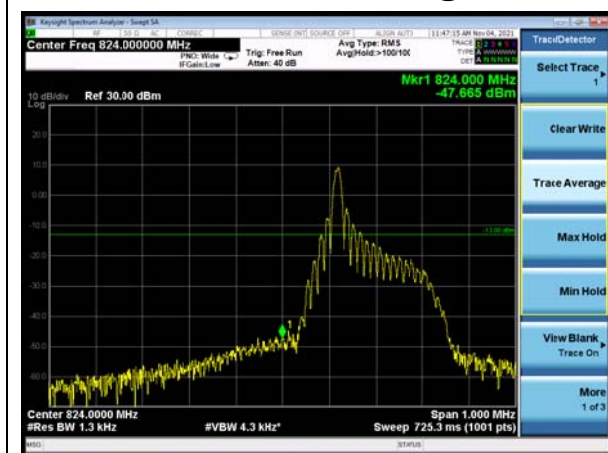


NB-IOT Band 5 BPSK 15kHz 1@0 CH-High



Band Edge Compliance

NB-IOT Band 5 BPSK 15kHz 1@0 CH-Low



NB-IOT Band 5 BPSK 15kHz 1@11 CH-High



Peak-to-Average Power Ratio (PAPR)

Mode	Modulation	Sub-carrier spacing (KHz)	Channel/ Frequency(MHz)	Peak-to-Average Power Ratio (PAPR)		
				Peak(dBm)	Avg(dBm)	PAPR(dB)
Band 5 Standalone	BPSK	3.75	20525/836.5	26.20	21.31	4.89
	QPSK	3.75	20525/836.5	25.48	21.37	4.11
	BPSK	15	20525/836.5	25.80	18.57	7.23
	QPSK	15	20525/836.5	25.43	18.47	6.96

Frequency Stability

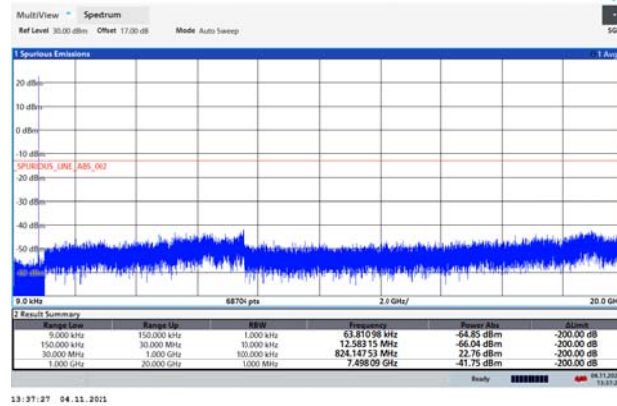
NB-IOT Band 5						
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability(ppm)	Frequency Stability(ppm)	Verdict
Sub-carrier spacing (KHz)	3.75					
Temperature	Voltage	BPSK	QPSK	BPSK	QPSK	
Normal(25℃)	Normal	6.88	1.54	0.00366	0.00082	PASS
Extreme(85℃)		10.44	7.97	0.00555	0.00424	PASS
Extreme(80℃)		14.89	8.66	0.00792	0.00461	PASS
Extreme(70℃)		15.68	7.26	0.00834	0.00386	PASS
Extreme(60℃)		3.21	11.87	0.00171	0.00631	PASS
Extreme(50℃)		5.76	7.40	0.00306	0.00394	PASS
Extreme(40℃)		9.89	12.06	0.00526	0.00641	PASS
Extreme(30℃)		5.85	12.25	0.00311	0.00651	PASS
Extreme(20℃)		3.28	11.20	0.00174	0.00596	PASS
Extreme(10℃)		16.63	16.75	0.00884	0.00891	PASS
Extreme(0℃)		15.99	15.82	0.00850	0.00842	PASS
Extreme(-10℃)		15.40	6.49	0.00819	0.00345	PASS
Extreme(-20℃)		17.18	2.60	0.00914	0.00138	PASS
Extreme(-30℃)		1.88	9.98	0.00100	0.00531	PASS
Extreme(-40℃)		3.74	6.64	0.00199	0.00353	PASS
25℃	LV	15.98	7.83	0.00850	0.00417	PASS
	HV	2.79	2.00	0.00148	0.00106	PASS
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability(ppm)	Frequency Stability(ppm)	Verdict
Sub-carrier spacing (KHz)	15					
Temperature	Voltage	BPSK	QPSK	BPSK	QPSK	
Normal(25℃)	Normal	14.76	6.05	0.00785	0.00322	PASS
Extreme(85℃)		5.34	14.00	0.00284	0.00745	PASS
Extreme(80℃)		2.66	6.22	0.00141	0.00331	PASS
Extreme(70℃)		10.34	5.20	0.00550	0.00277	PASS
Extreme(60℃)		17.30	4.71	0.00920	0.00251	PASS
Extreme(50℃)		2.43	14.79	0.00129	0.00787	PASS
Extreme(40℃)		12.53	7.57	0.00667	0.00402	PASS
Extreme(30℃)		10.23	2.06	0.00544	0.00110	PASS
Extreme(20℃)		3.00	5.03	0.00160	0.00267	PASS
Extreme(10℃)		17.41	6.49	0.00926	0.00345	PASS
Extreme(0℃)		15.18	12.86	0.00807	0.00684	PASS



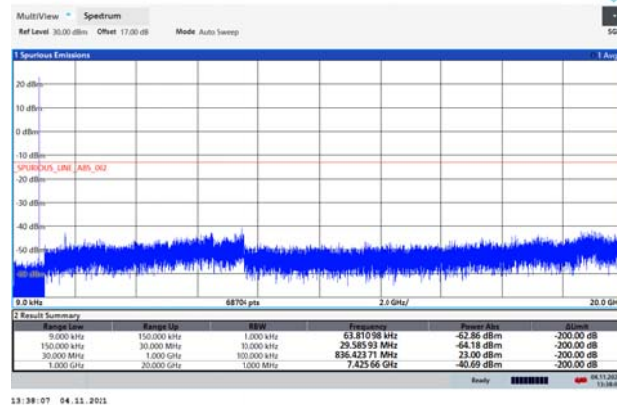
Extreme(-10℃)		6.53	11.68	0.00347	0.00621	PASS
Extreme(-20℃)		3.80	13.68	0.00202	0.00727	PASS
Extreme(-30℃)		17.49	16.62	0.00930	0.00884	PASS
Extreme(-40℃)		15.66	15.12	0.00833	0.00804	PASS
25℃	LV	12.14	12.74	0.00646	0.00678	PASS
	HV	10.21	10.39	0.00543	0.00553	PASS

Spurious Emissions at Antenna Terminals

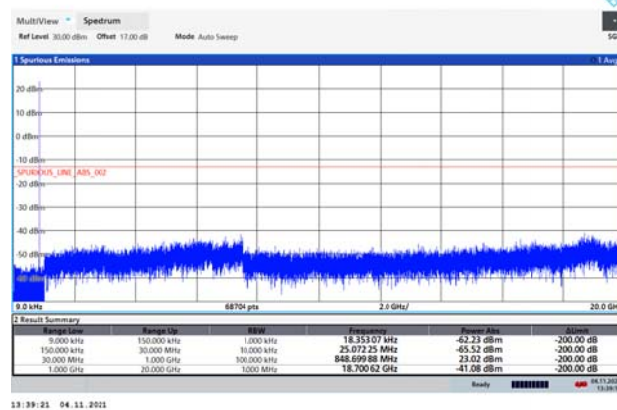
NB-IOT Band 5 CH-Low 9kHz-20GHz



NB-IOT Band 5 CH-Middle 9kHz-20GHz



NB-IOT Band 5 CH-High 9kHz-20GHz



Radiates Spurious Emission

NB-IoT Band 5 15kHz+QPSK CH-High

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1697.8	-48.55	2.00	10.75	Horizontal	-41.95	-13.00	28.95	270
3	2546.7	-38.84	2.51	11.05	Horizontal	-32.45	-13.00	19.45	315
4	3395.6	-63.35	4.20	11.15	Horizontal	-58.55	-13.0	45.55	315
5	4244.5	-60.41	5.20	11.15	Horizontal	-56.61	-13.0	43.61	315
6	5093.4	-58.70	5.50	11.95	Horizontal	-54.40	-13.0	41.40	315
7	5942.3	-59.84	5.70	13.55	Horizontal	-54.14	-13.0	41.14	180
8	6791.2	-58.58	6.30	13.75	Horizontal	-53.28	-13.0	40.28	0
9	7640.1	-55.38	6.80	13.85	Horizontal	-50.48	-13.0	37.48	315
10	8489.0	-55.80	6.90	14.25	Horizontal	-50.60	-13.0	37.60	45

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2.The worst emission was found in the antenna is Horizontal position.

Main Test Instruments

Date of Testing (variant): August 31, 2021 ~ November 5, 2021

Name	Manufacturer	Type	Serial Number	Calibration Date	Expiration Date
Base Station Simulator	R&S	CMW500	113824	2021-05-15	2022-05-14
Climate Chamber	Weiss	VT4002	58226119450010	2021-05-15	2022-05-14
Spectrum Analyzer	Key sight	N9020	MY52330084	2021-05-15	2022-05-14
Signal Analyzer	R&S	FSV3030	101411	2020-12-13	2021-12-12
Signal Analyzer	R&S	FSV30	100815	2020-12-13	2021-12-12
TRILOG Broadband Antenna	Schwarzbeck	VULB 9163	01111	2019--9-12	2022-09-11
Horn Antenna	Schwarzbeck	BBHA 9120D	1594	2020-12-17	2021-12-16