



Appendix B

LTE-NB1 Band 5





CONTENT

	Page
1 EFFECTIVE (ISOTROPIC) RADIATED POWER OUTPUT DATA.....	3
1.1 TEST RESULT FOR LTE NB1 BAND 5	3
2 PEAK-TO-AVERAGE RATIO.....	4
2.1 FOR LTE-NB1	4
2.1.1 Test Band = LTE-NB1 Band 5	4
3 MODULATION CHARACTERISTICS	6
3.1 FOR LTE-NB1	6
3.1.1 Test Band = LTE-NB1 Band 5	6
4 BANDWIDTH	8
4.1 FOR LTE-NB1	8
4.1.1 Test Band = LTE-NB1 Band 5	8
5 BAND EDGES COMPLIANCE.....	10
5.1 FOR LTE-NB1	10
5.1.1 Test Band = LTE-NB1 Band 5	10
6 SPURIOUS EMISSION AT ANTENNA TERMINAL	15
6.1 FOR LTE-NB1	15
6.1.1 Test Band = LTE-NB1 Band 5	15
7 FIELD STRENGTH OF SPURIOUS RADIATION.....	22
7.1 FOR LTE-NB1	22
7.1.1 Test Band = LTE-NB1 Band 5	22
8 FREQUENCY STABILITY	24
8.1 FREQUENCY ERROR VS. VOLTAGE	24
8.2 FREQUENCY ERROR VS. TEMPERATURE.....	24



1 Effective (Isotropic) Radiated Power Output Data

1.1 Test Result for LTE NB1 Band 5

Test Band	Test Mode	Sub-carrier Spacing (kHz)	Test channel	Number of T	Conducted Power (dBm)	ERP (dBm)	limit (dBm)	Verdict
NB1 Band 5	BPSK	3.75	20401	1T0	23.02	21.99	38.45	PASS
NB1 Band 5	BPSK	3.75	20401	1T47	23.12	22.09	38.45	PASS
NB1 Band 5	BPSK	3.75	20525	1T0	23.10	22.07	38.45	PASS
NB1 Band 5	BPSK	3.75	20525	1T47	22.89	21.86	38.45	PASS
NB1 Band 5	BPSK	3.75	20649	1T0	23.11	22.08	38.45	PASS
NB1 Band 5	BPSK	3.75	20649	1T47	23.14	22.11	38.45	PASS
NB1 Band 5	QPSK	3.75	20401	1T0	22.94	21.91	38.45	PASS
NB1 Band 5	QPSK	3.75	20401	1T47	23.01	21.98	38.45	PASS
NB1 Band 5	QPSK	3.75	20525	1T0	22.87	21.84	38.45	PASS
NB1 Band 5	QPSK	3.75	20525	1T47	23.15	22.12	38.45	PASS
NB1 Band 5	QPSK	3.75	20649	1T0	23.05	22.02	38.45	PASS
NB1 Band 5	QPSK	3.75	20649	1T47	23.03	22.00	38.45	PASS

Test Band	Test Mode	Sub-carrier Spacing (kHz)	Test channel	Number of T	Conducted Power (dBm)	ERP (dBm)	limit (dBm)	Verdict
NB1 Band 5	BPSK	15	20401	1T0	23.08	22.05	38.45	PASS
NB1 Band 5	BPSK	15	20401	1T11	22.81	21.78	38.45	PASS
NB1 Band 5	BPSK	15	20525	1T0	23.00	21.97	38.45	PASS
NB1 Band 5	BPSK	15	20525	1T11	23.01	21.98	38.45	PASS
NB1 Band 5	BPSK	15	20649	1T0	23.08	22.05	38.45	PASS
NB1 Band 5	BPSK	15	20649	1T11	23.13	22.10	38.45	PASS
NB1 Band 5	QPSK	15	20401	1T0	22.93	21.90	38.45	PASS
NB1 Band 5	QPSK	15	20401	1T11	22.94	21.91	38.45	PASS
NB1 Band 5	QPSK	15	20401	12T0	21.75	20.72	38.45	PASS
NB1 Band 5	QPSK	15	20525	1T0	22.86	21.83	38.45	PASS
NB1 Band 5	QPSK	15	20525	1T11	22.87	21.84	38.45	PASS
NB1 Band 5	QPSK	15	20525	12T0	22.11	21.08	38.45	PASS
NB1 Band 5	QPSK	15	20649	1T0	23.00	21.97	38.45	PASS
NB1 Band 5	QPSK	15	20649	1T11	23.05	22.02	38.45	PASS
NB1 Band 5	QPSK	15	20649	12T0	21.86	20.83	38.45	PASS

Note:

a: For getting the EIRP (Efficient Isotropic Radiated Power) in substitution method, the following formula should be taken to calculate it,

$EIRP [dBm] = \text{Conducted Power} [dBm] + \text{Gain} [dBi]$

$ERP [dBm] = \text{Conducted Power} [dBm] + \text{Gain} [dBi] - 2.15$



Unless otherwise agreed in writing, this document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <http://www.sgs.com/en/Terms-and-Conditions/Terms-e-Documents.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

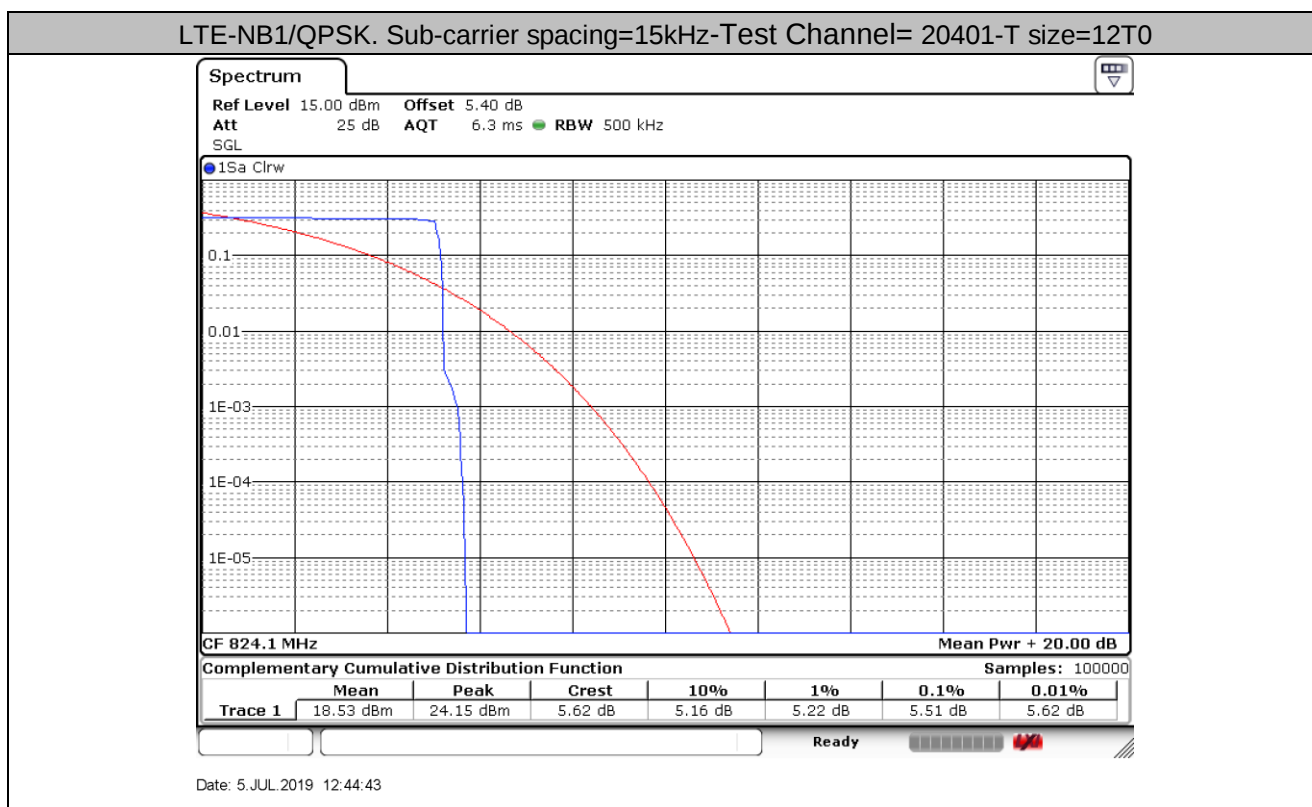
Attention: To check the authenticity of testing / inspection report & certificate, please contact us at telephone: (86-755) 8307 1443, or email: CN.Doccheck@sgs.com
No.1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, China 518057 t (86-755) 26012053 f (86-755) 26710594 www.sgsgroup.com.cn
中国·深圳·科技园中区M-10栋一号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com

2 Peak-to-Average Ratio

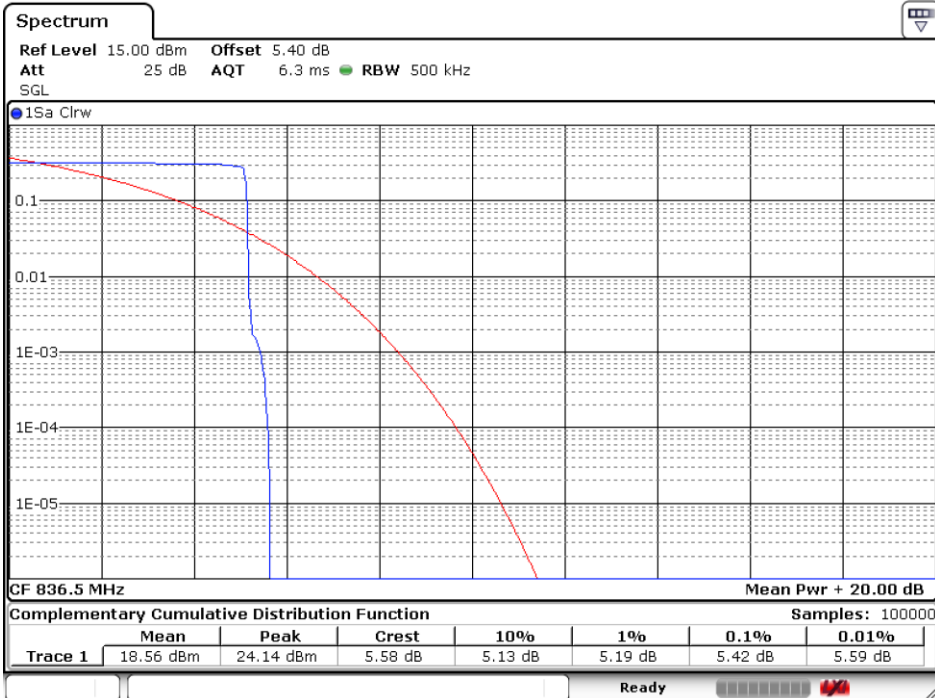
Test Band	Test Mode	Test Channel	Measured[dB]	Limit [dB]	Verdict
NB1 Band 5	QPSK/12T0	20401	5.51	13	PASS
NB1 Band 5	QPSK/12T0	20525	5.42	13	PASS
NB1 Band 5	QPSK/12T0	20649	5.65	13	PASS

2.1 For LTE-NB1

2.1.1 Test Band = LTE-NB1 Band 5

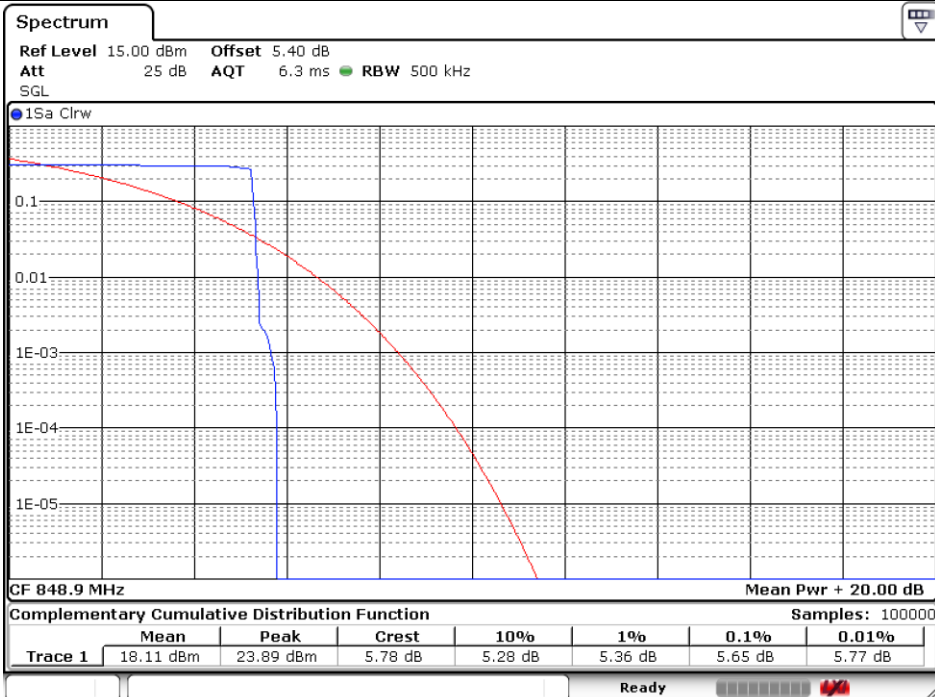


LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel= 20525-T size=12T0



Date: 5 JUL 2019 12:50:02

LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel= 20649-T size=12T0



Date: 5 JUL 2019 12:57:13



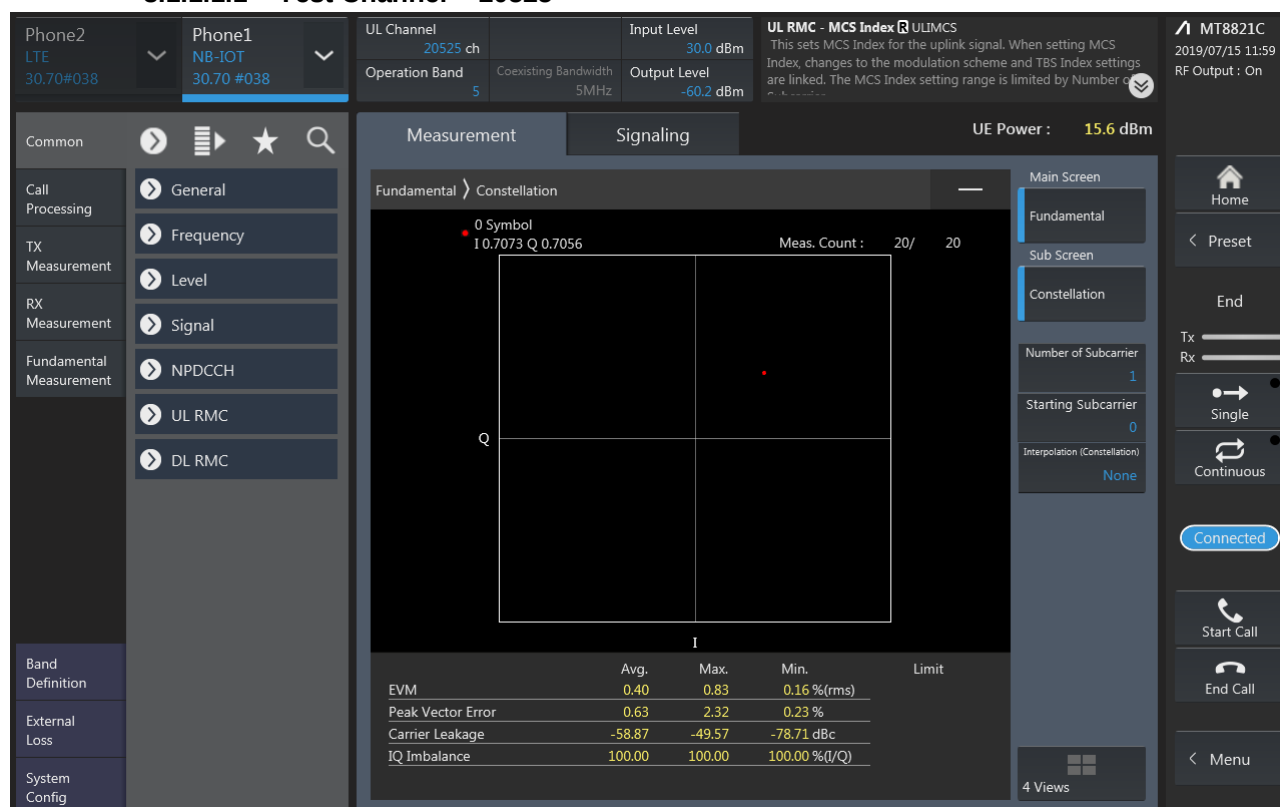
3 Modulation Characteristics

3.1 For LTE-NB1

3.1.1 Test Band = LTE-NB1 Band 5

3.1.1.1 Test Mode = LTE-NB1/BPSK. Sub-carrier spacing=15kHz.T size=12T0

3.1.1.1.1 Test Channel = 20525



Unless otherwise agreed in writing, this document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <http://www.sgs.com/en/Terms-and-Conditions/Terms-e-Documents.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

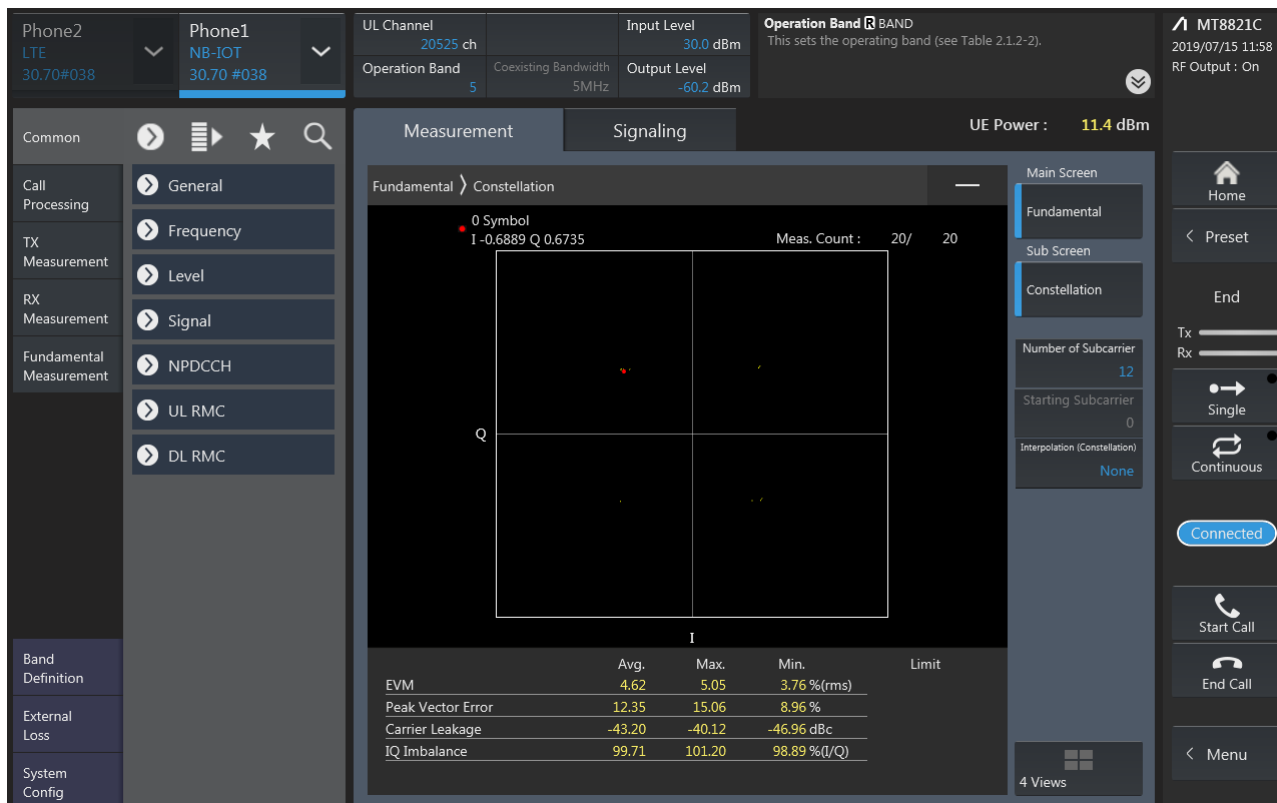
Attention: To check the authenticity of testing /inspection report & certificate, please contact us at telephone: (86-755) 8307 1443, or email: CN.Doccheck@sgs.com

SGS-CSTC Standards Technical Services Co.,Ltd.
Shenzhen Branch Testing Center ETC Laboratory.

No.1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, China 518057 t (86-755) 26012053 f (86-755) 26710594 www.sgsgroup.com.cn
中国·深圳·科技园中区M-10栋一号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com

3.1.1.2 Test Mode = LTE-NB1/QPSK. Sub-carrier spacing=15kHz.T size=12T0

3.1.1.2.1 Test Channel = 20525

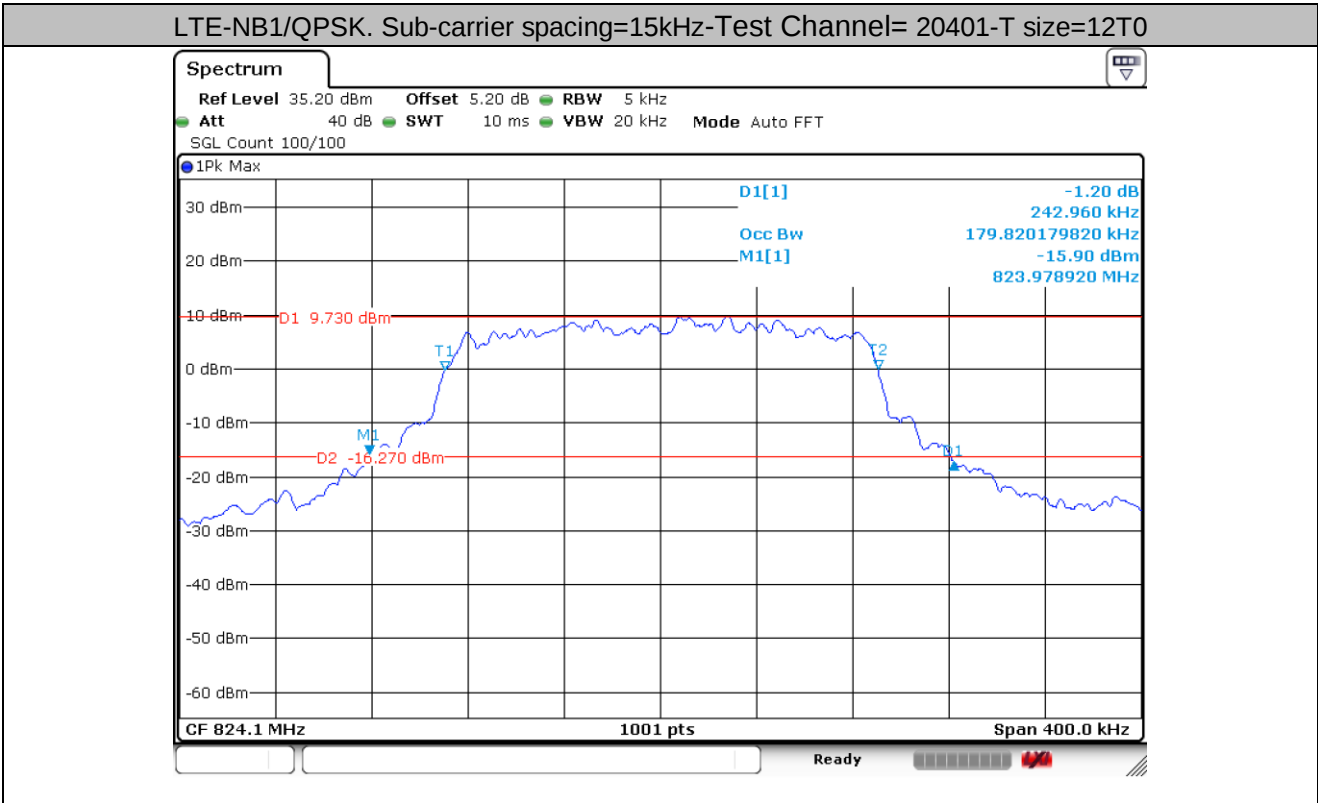


4 Bandwidth

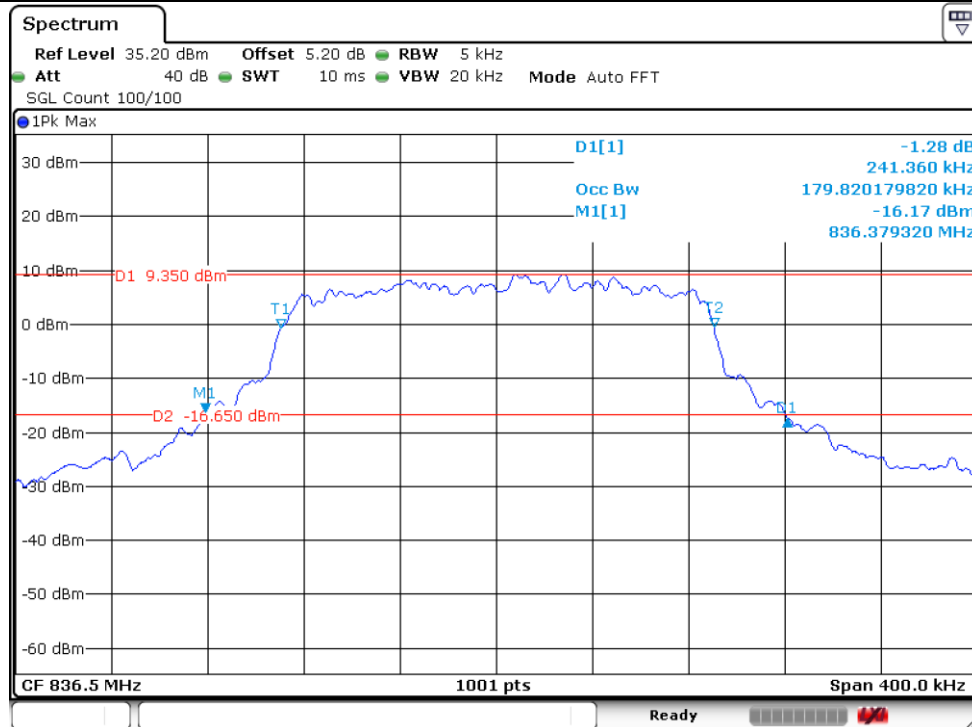
Test Band	Test Mode	T size	Test Channel	Occupied Bandwidth [kHz]	Emission Bandwidth [kHz]	Verdict
NB1 Band 5	QPSK/15kHz	12T0	20401	179.82	242.96	PASS
NB1 Band 5	QPSK/15kHz	12T0	20525	179.82	241.36	PASS
NB1 Band 5	QPSK/15kHz	12T0	20649	179.02	240.16	PASS

4.1 For LTE-NB1

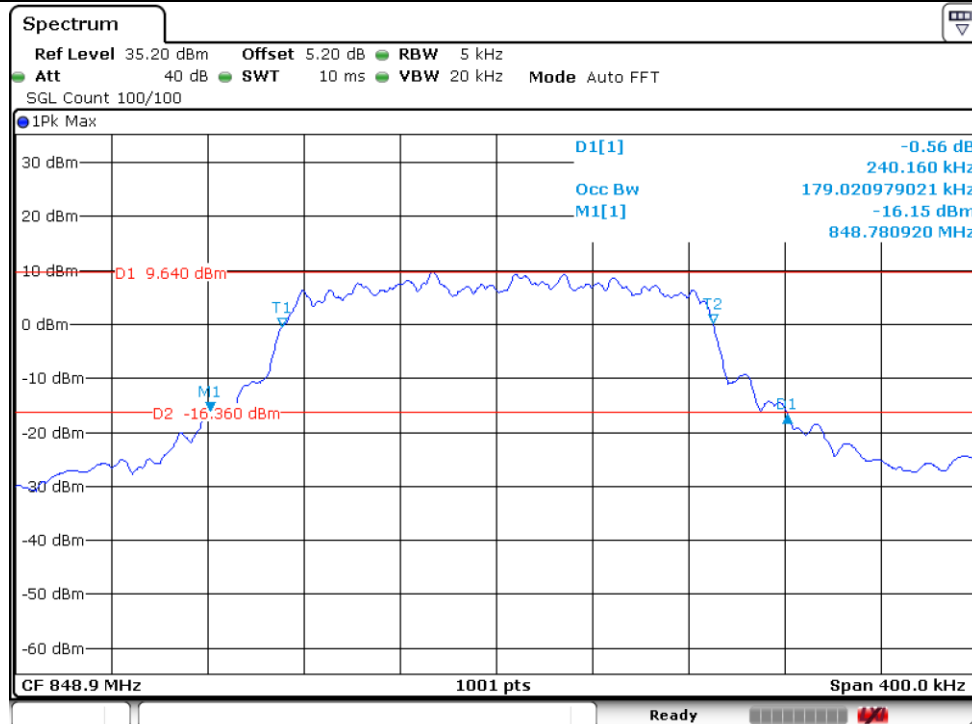
4.1.1 Test Band = LTE-NB1 Band 5



LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel= 20525-T size=12T0



LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel= 20649-T size=12T0

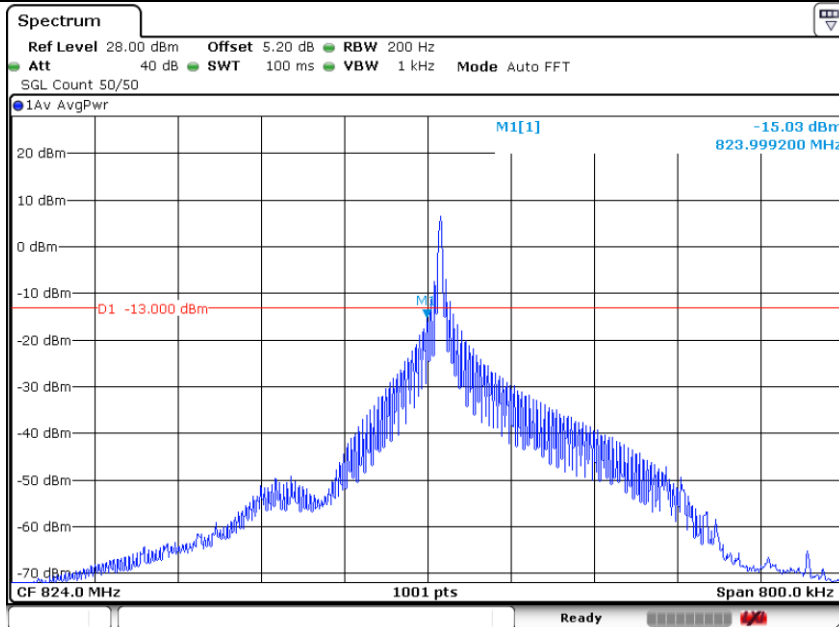


5 Band Edges Compliance

5.1 For LTE-NB1

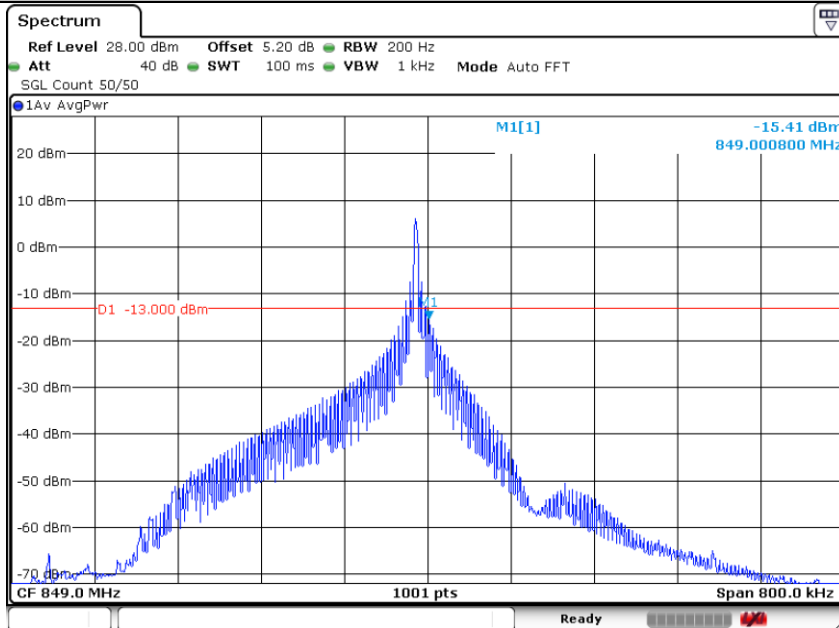
5.1.1 Test Band = LTE-NB1 Band 5

LTE-NB1/BPSK. Sub-carrier spacing=3.75kHz-Test Channel=20401-T size=1T0



Date: 20.AUG.2019 05:30:42

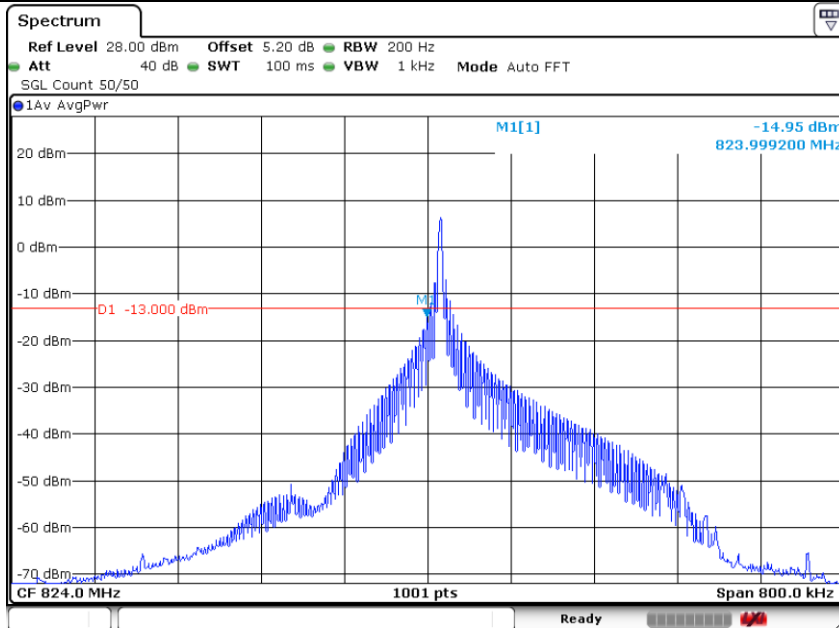
LTE-NB1/BPSK. Sub-carrier spacing=3.75kHz-Test Channel=20649-T size=1T47



Date: 20.AUG.2019 05:40:44

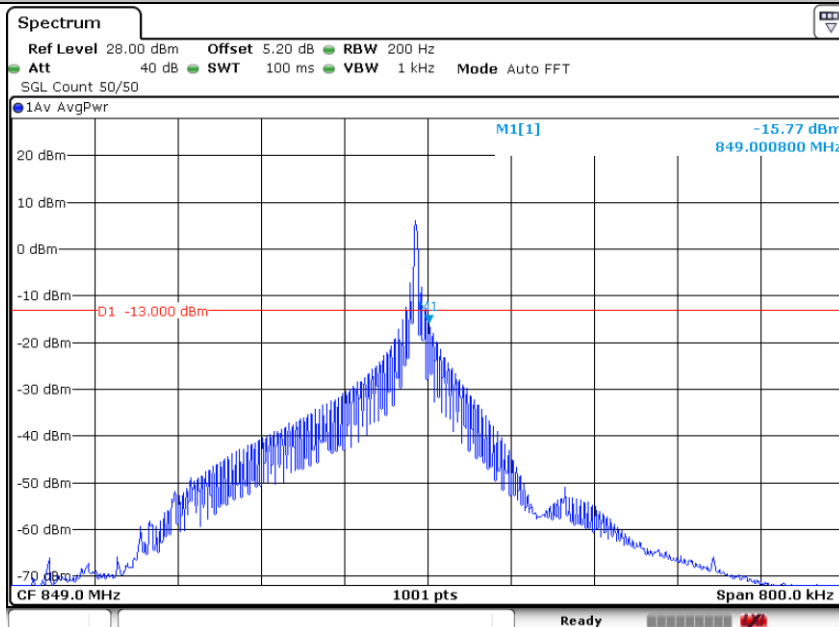


LTE-NB1/QPSK. Sub-carrier spacing=3.75kHz-Test Channel=20401-T size=1T0



Date: 20.AUG.2019 05:32:47

LTE-NB1/QPSK. Sub-carrier spacing=3.75kHz-Test Channel=20649-T size=1T47



Date: 20.AUG.2019 05:40:18

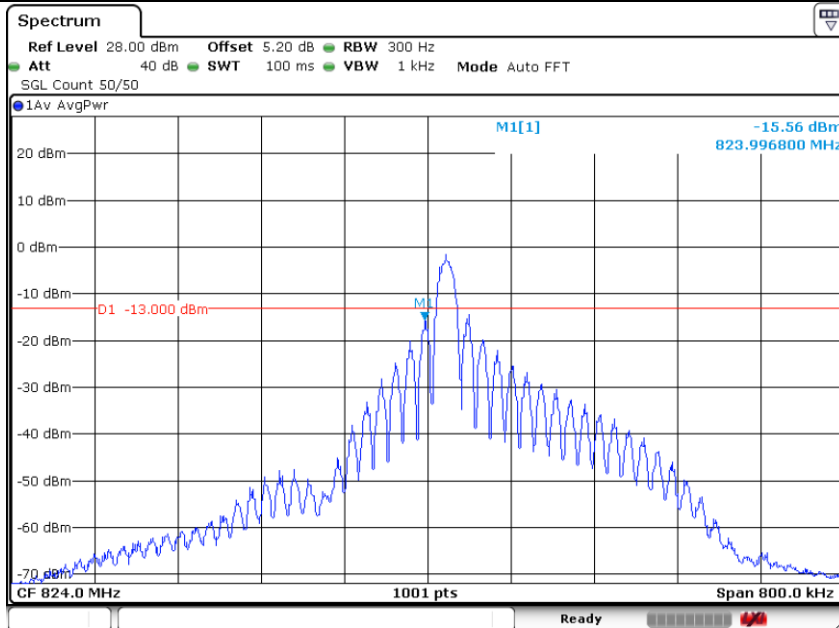


SGS-CSTC Standards Technical Services Co.,Ltd.
Shenzhen Branch Testing Center E&C Laboratory

Unless otherwise agreed in writing, this document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <http://www.sgs.com/en/Terms-and-Conditions/Terms-e-Document.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

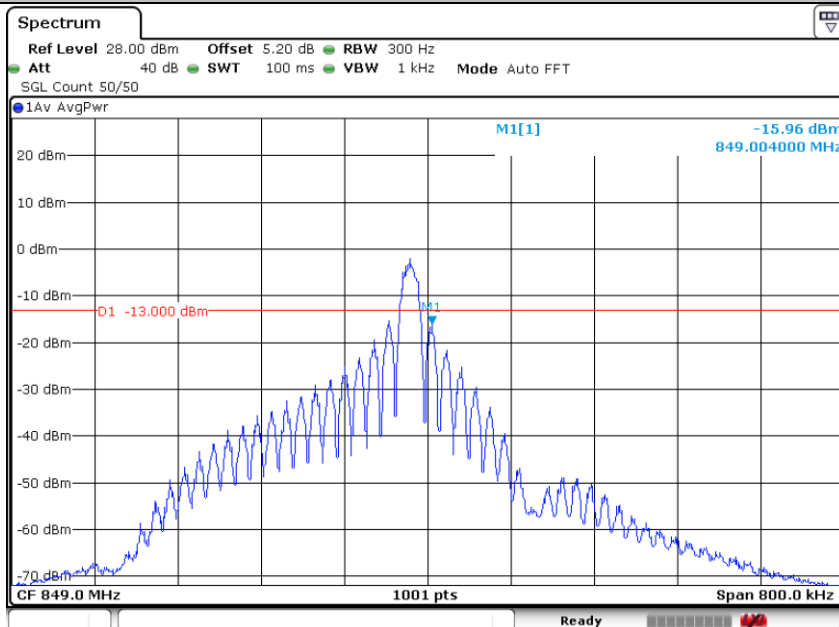
Attention: To check the authenticity of testing /inspection report & certificate, please contact us at telephone: (86-755) 8307 1443, or email: CN.Doccheck@sgs.com
No.1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, China 518057 t (86-755) 26012053 f (86-755) 26710594 www.sgsgroup.com.cn
中国·深圳·科技园中区M-10栋一号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com

LTE-NB1/BPSK. Sub-carrier spacing=15kHz-Test Channel=20401-T size=1T0



Date: 20.AUG.2019 05:35:50

LTE-NB1/BPSK. Sub-carrier spacing=15kHz-Test Channel=20649-T size=1T11



Date: 20.AUG.2019 05:39:32

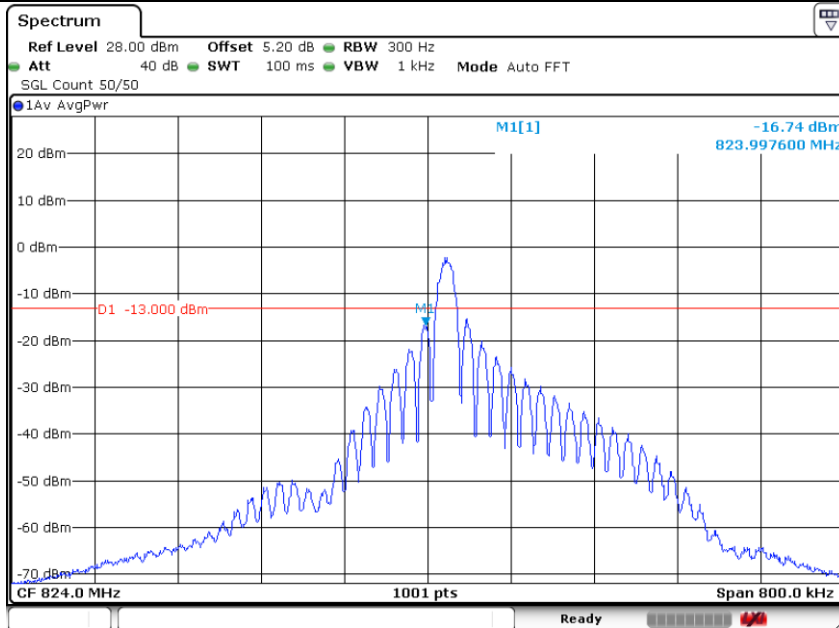


SGS-CSTC Standards Technical Services Co.,Ltd.
 Shenzhen Branch Testing Center E&C Laboratory

Unless otherwise agreed in writing, this document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <http://www.sgs.com/en/Terms-and-Conditions/Terms-e-Documents.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

Attention: To check the authenticity of testing /inspection report & certificate, please contact us at telephone: (86-755) 8307 1443, or email: CN.Doccheck@sgs.com
 No.1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, China 518057 t (86-755) 26012053 f (86-755) 26710594 www.sgsgroup.com.cn
 中国·深圳·科技园中区M-10栋一号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com

LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=20401-T size=1T0



Date: 20.AUG.2019 05:35:20

LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=20401-T size=12T0



Date: 20.AUG.2019 05:36:37

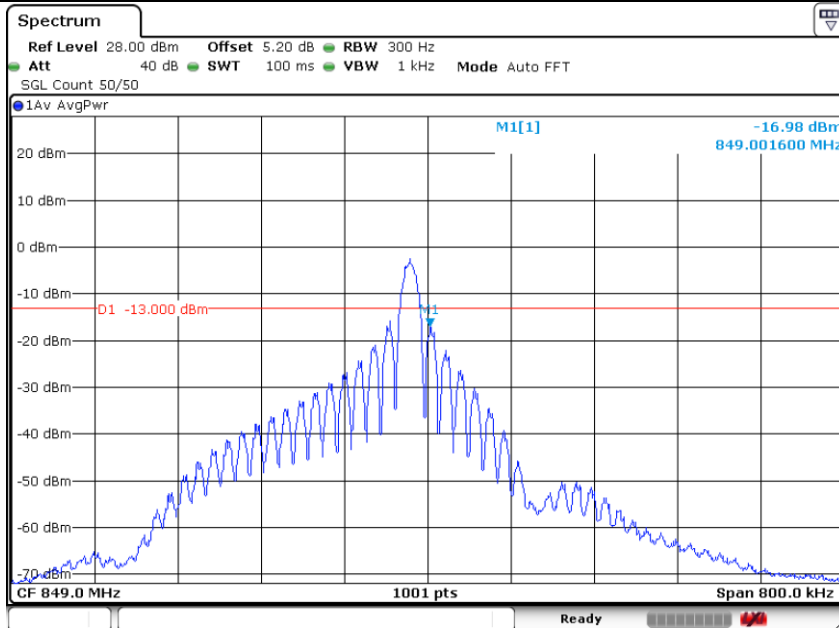


SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch Testing Center ETC Laboratory

Unless otherwise agreed in writing, this document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <http://www.sgs.com/en/Terms-and-Conditions/Terms-e-Document.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

Attention: To check the authenticity of testing /inspection report & certificate, please contact us at telephone: (86-755) 8307 1443, or email: CN.Doccheck@sgs.com
No.1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, China 518057 t (86-755) 26012053 f (86-755) 26710594 www.sgsgroup.com.cn
中国·深圳·科技园中区M-10栋一号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com

LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=20649-T size=1T11



Date: 20.AUG.2019 05:38:29

LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=20649-T size=12T0



Date: 20.AUG.2019 05:37:42



SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch Inspection & Testing Services

Unless otherwise agreed in writing, this document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <http://www.sgs.com/en/Terms-and-Conditions/Terms-e-Document.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

Attention: To check the authenticity of testing / inspection report & certificate, please contact us at telephone: (86-755) 8307 1443, or email: CN.Doccheck@sgs.com

No.1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, China 518057 t (86-755) 26012053 f (86-755) 26710594 www.sgsgroup.com.cn
中国·深圳·科技园中区M-10栋一号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com

6 Spurious Emission at Antenna Terminal

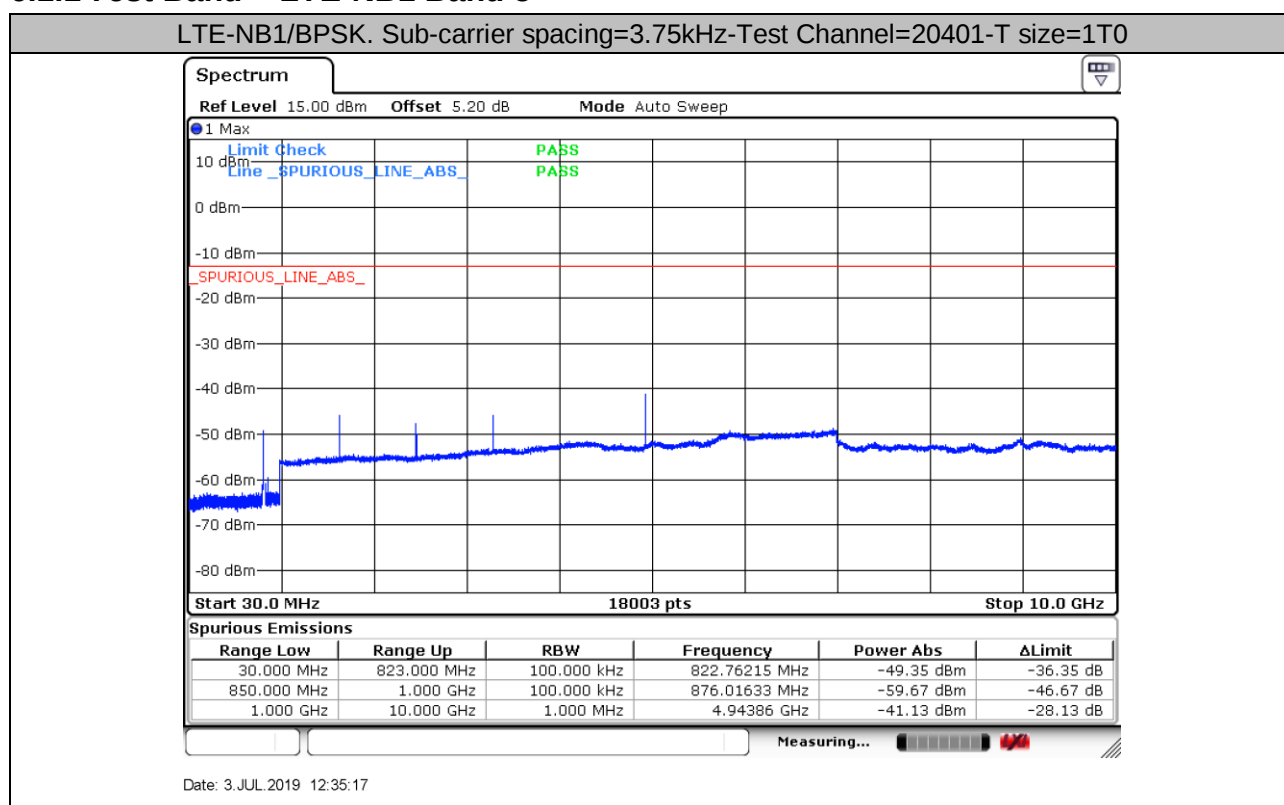
NOTE1: For the averaged unwanted emissions measurements, the measurement points in each sweep is greater than twice the Span/RBW in order to ensure bin-to-bin spacing of $< RBW/2$ so that narrowband signals are not lost between frequency bins. As to the present test item, the "Measurement Points = $k \cdot (\text{Span} / \text{RBW})$ " with k between 4 and 5, which results in an acceptable level error of less than 0.5 dB.

NOTE2: only the worst case data displayed in this report.

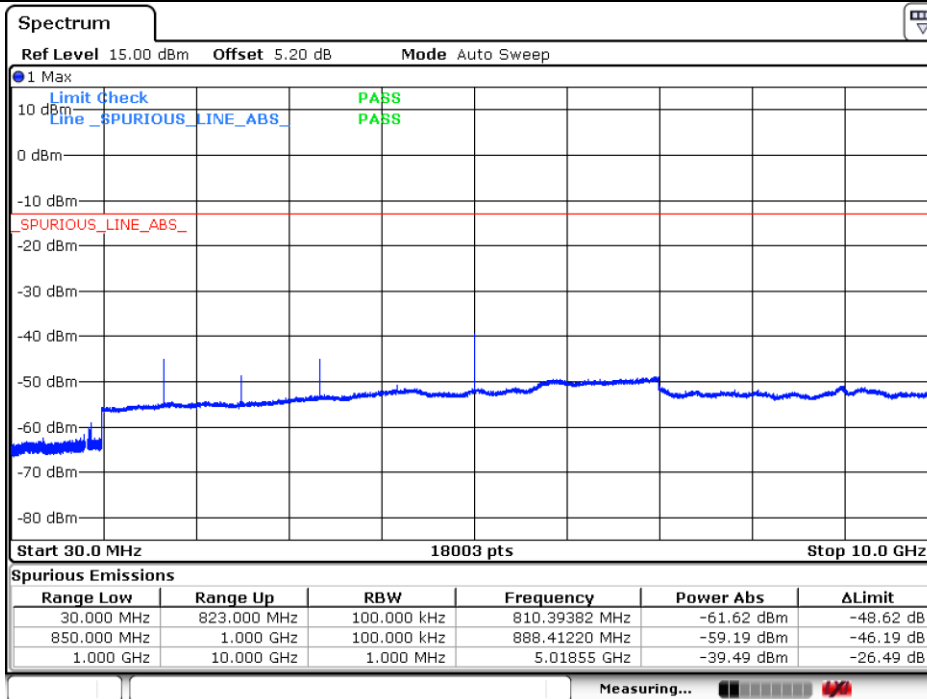
Part I - Test Plots

6.1 For LTE-NB1

6.1.1 Test Band = LTE-NB1 Band 5

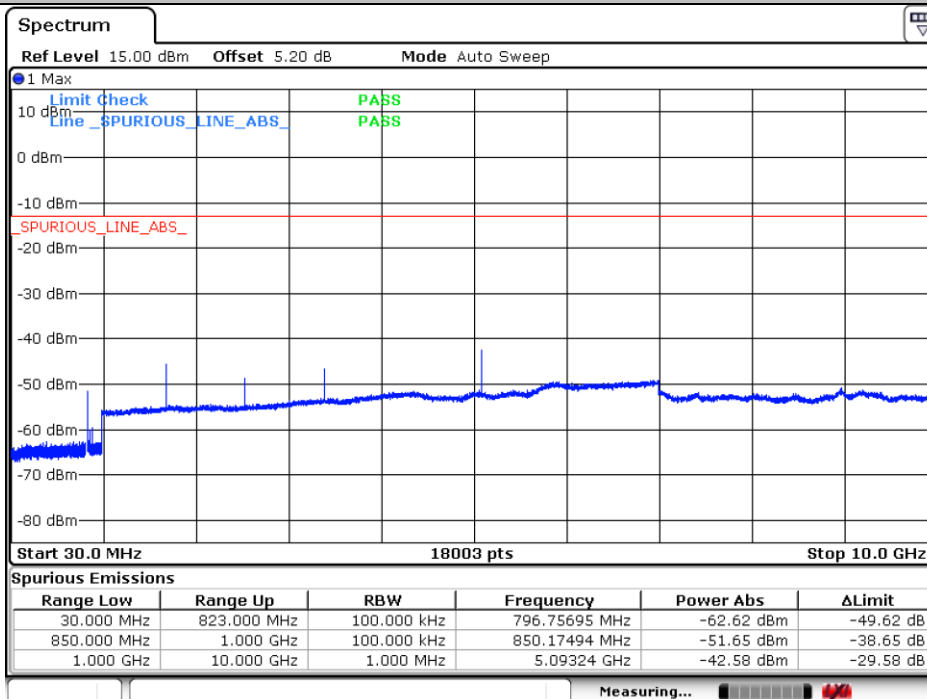


LTE-NB1/BPSK. Sub-carrier spacing=3.75kHz-Test Channel=20525-T size=1T0



Date: 3 JUL 2019 12:42:58

LTE-NB1/BPSK. Sub-carrier spacing=3.75kHz-Test Channel=20649-T size=1T0



Date: 3 JUL 2019 12:45:38



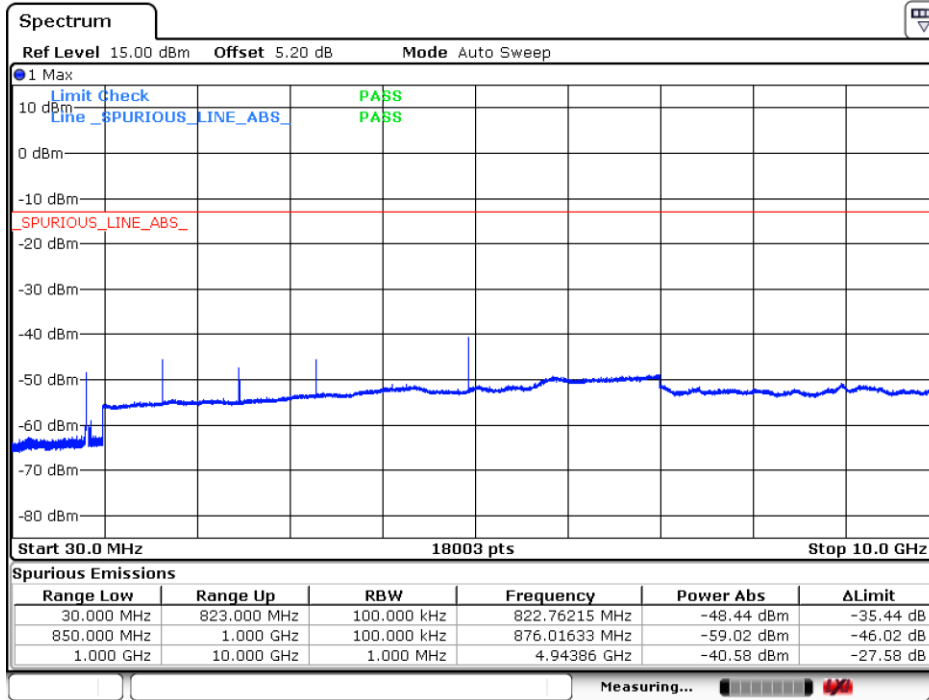
SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch Testing Laboratory

Unless otherwise agreed in writing, this document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <http://www.sgs.com/en/Terms-and-Conditions/Terms-e-Documents.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

Attention: To check the authenticity of testing / inspection report & certificate, please contact us at telephone: (86-755) 8307 1443, or email: CN.Doccheck@sgs.com

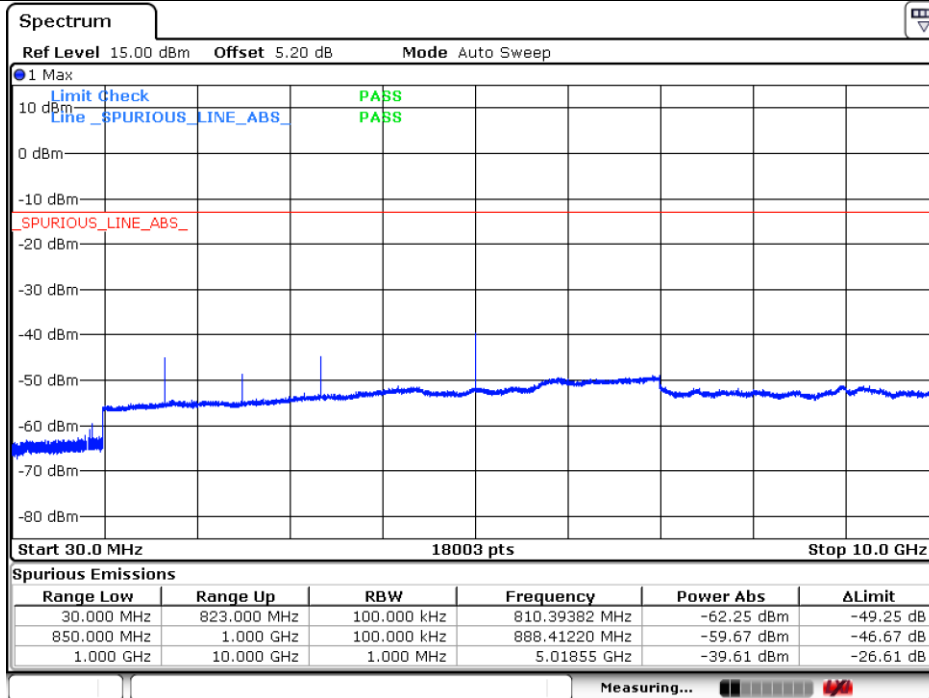
No.1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, China 518057 t (86-755) 26012053 f (86-755) 26710594 www.sgsgroup.com.cn
中国·深圳·科技园中区M-10栋一号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com

LTE-NB1/QPSK. Sub-carrier spacing=3.75kHz-Test Channel=20401-T size=1T0



Date: 3 JUL 2019 12:36:41

LTE-NB1/QPSK. Sub-carrier spacing=3.75kHz-Test Channel=20525-T size=1T0



Date: 3 JUL 2019 12:42:14



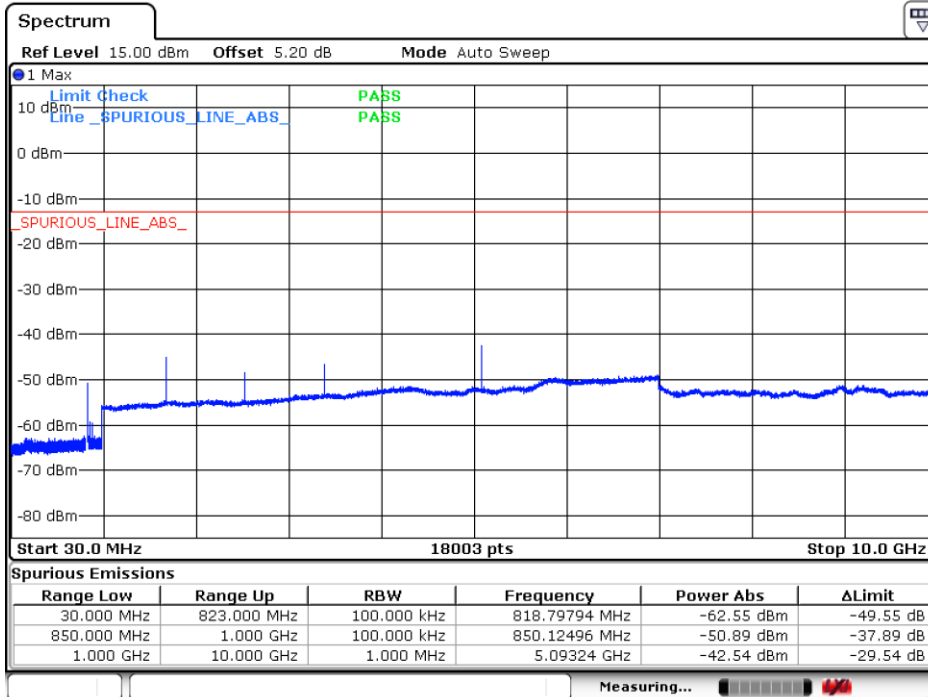
SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch Testing Laboratory

Unless otherwise agreed in writing, this document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <http://www.sgs.com/en/Terms-and-Conditions/Terms-e-Documents.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

Attention: To check the authenticity of testing/inspection report & certificate, please contact us at telephone: (86-755) 8307 1443, or email: CN.Doccheck@sgs.com

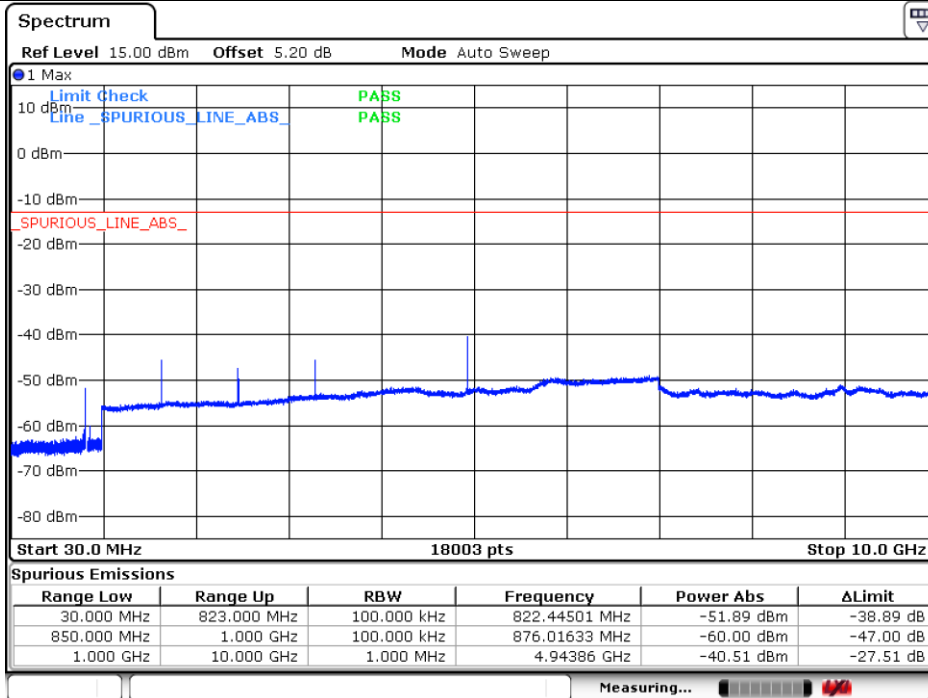
No.1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, China 518057 t (86-755) 26012053 f (86-755) 26710594 www.sgsgroup.com.cn
中国·深圳·科技园中区M-10栋一号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com

LTE-NB1/QPSK. Sub-carrier spacing=3.75kHz-Test Channel=20649-T size=1T0



Date: 3 JUL 2019 12:47:06

LTE-NB1/BPSK. Sub-carrier spacing=15kHz-Test Channel=20401-T size=1T0



Date: 3 JUL 2019 12:38:02



SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch Testing Laboratory

Unless otherwise agreed in writing, this document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <http://www.sgs.com/en/Terms-and-Conditions/Terms-e-Documents.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

Attention: To check the authenticity of testing / inspection report & certificate, please contact us at telephone: (86-755) 8307 1443, or email: CN.Doccheck@sgs.com

No.1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, China 518057

中国·深圳·科技园中区M-10栋一号厂房

t (86-755) 26012053 f (86-755) 26710594

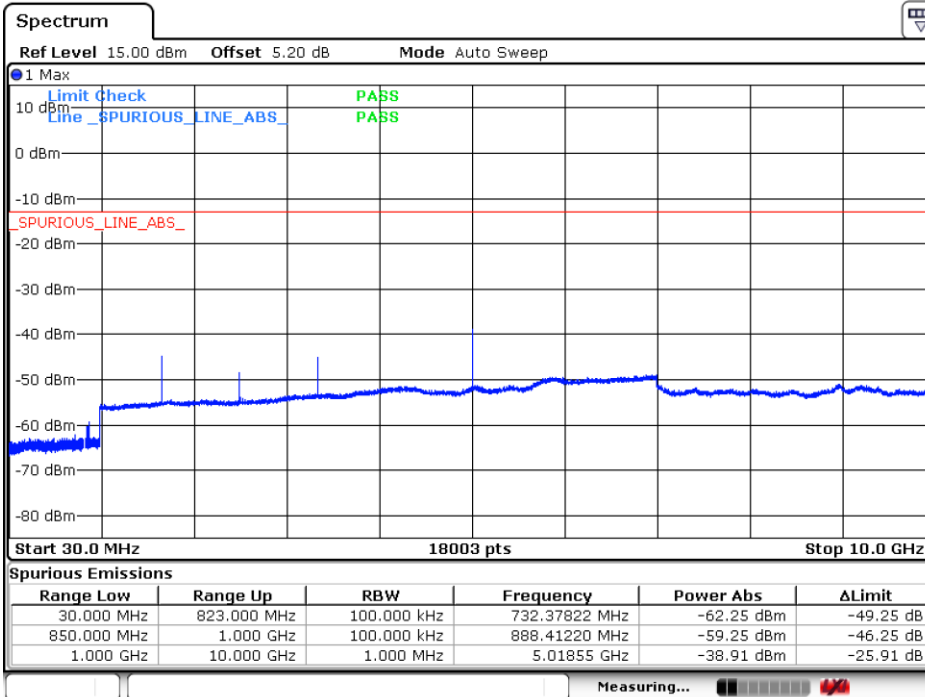
邮编: 518057

t (86-755) 26012053 f (86-755) 26710594

www.sgsgroup.com.cn

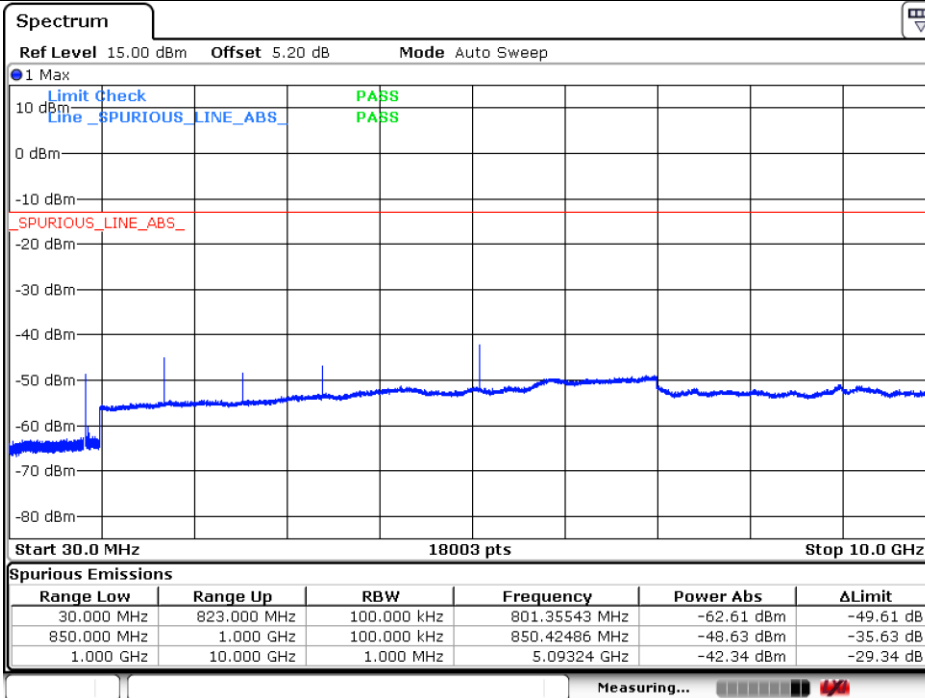
sgs.china@sgs.com

LTE-NB1/BPSK. Sub-carrier spacing=15kHz-Test Channel=20525-T size=1T0



Date: 3 JUL 2019 12:41:28

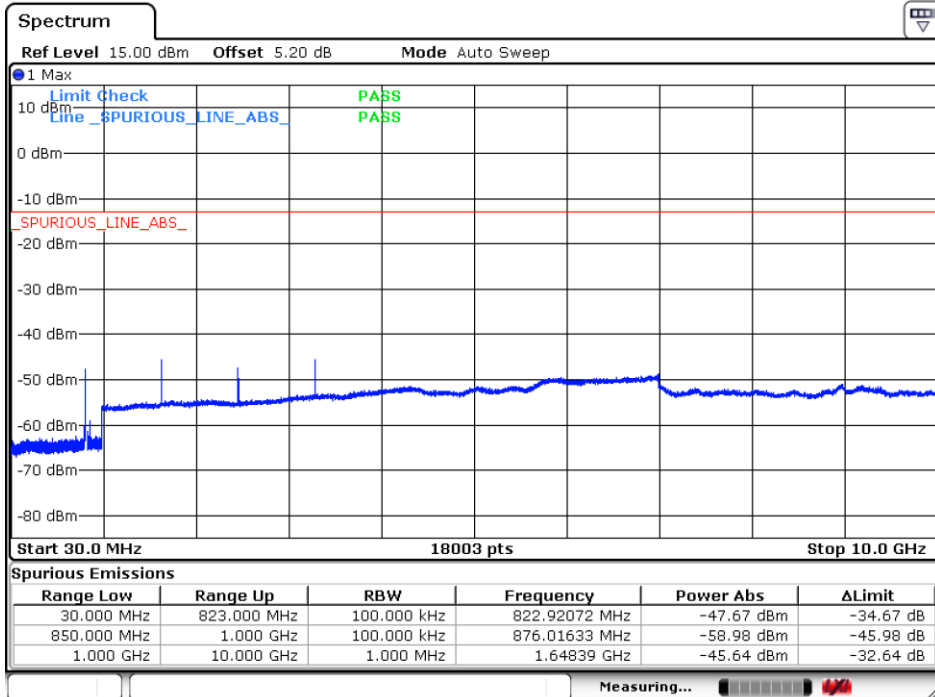
LTE-NB1/BPSK. Sub-carrier spacing=15kHz-Test Channel=20649-T size=1T0



Date: 3 JUL 2019 12:50:01

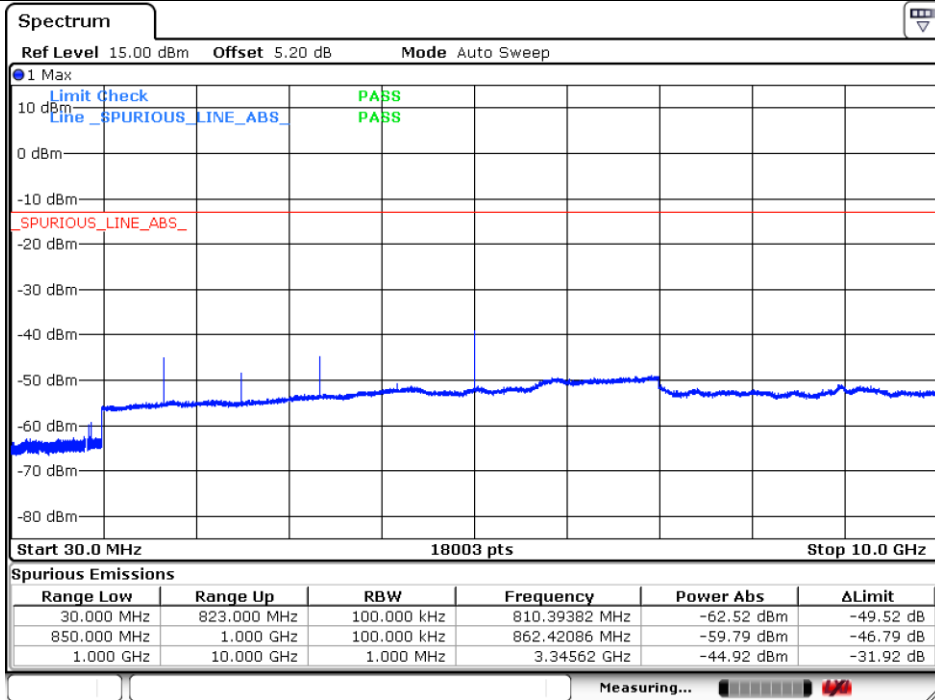


LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=20401-T size=1T0



Date: 3 JUL 2019 12:37:22

LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=20525-T size=1T0



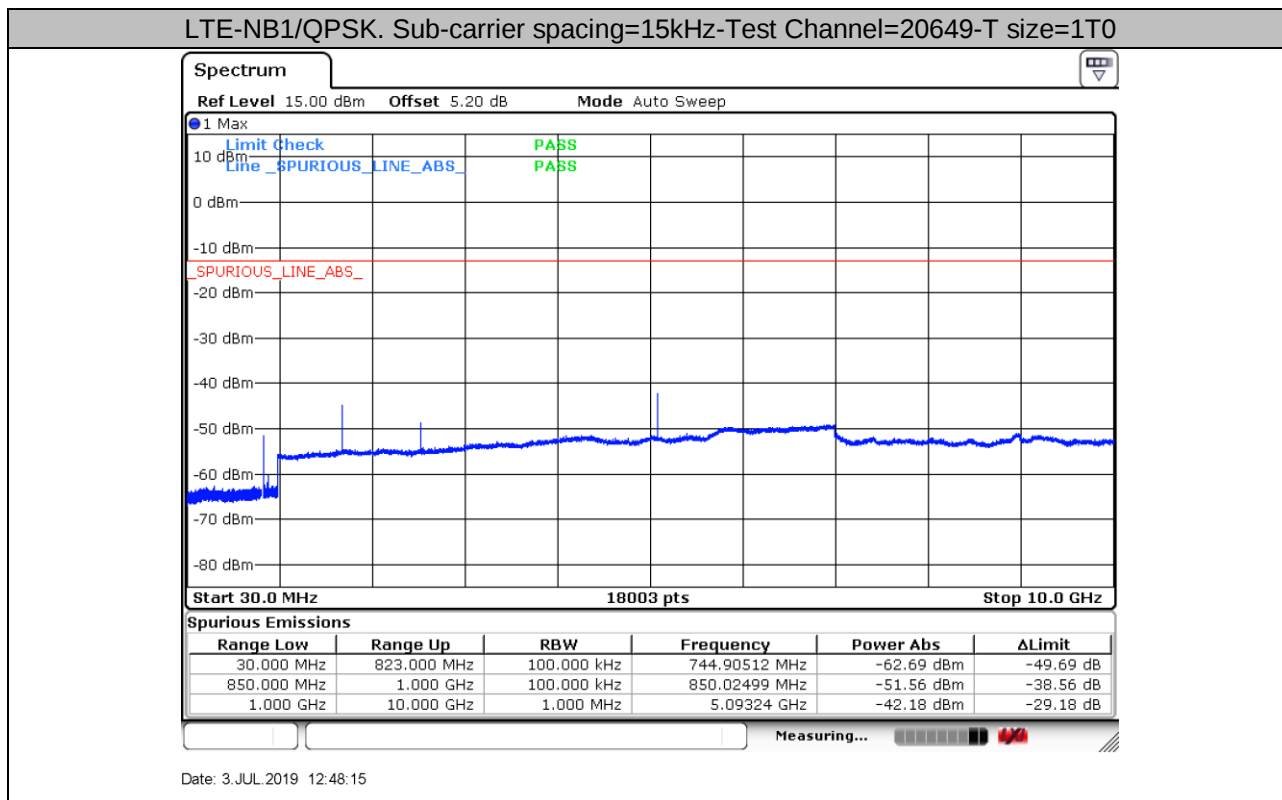
Date: 3 JUL 2019 12:40:36



SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch Testing Laboratory

Unless otherwise agreed in writing, this document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <http://www.sgs.com/en/Terms-and-Conditions/Terms-e-Documents.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

Attention: To check the authenticity of testing / inspection report & certificate, please contact us at telephone: (86-755) 8307 1443, or email: CN.Doccheck@sgs.com
No.1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, China 518057 t (86-755) 26012053 f (86-755) 26710594 www.sgsgroup.com.cn
中国·深圳·科技园中区M-10栋一号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com



7 Field Strength of Spurious Radiation

7.1 For LTE-NB1

7.1.1 Test Band = LTE-NB1 Band 5

7.1.1.1 Test Mode = LTE-NB1/BPSK. Sub-carrier spacing=3.75kHz

7.1.1.1.1 Test Channel = 20401

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
65.046667	-80.56	-13.00	67.56	Vertical
365.486667	-84.58	-13.00	71.58	Vertical
1653.000000	-61.79	-13.00	48.79	Vertical
2652.000000	-57.69	-13.00	44.69	Vertical
4958.287500	-62.49	-13.00	49.49	Vertical
8603.812500	-62.48	-13.00	49.48	Vertical
63.693333	-75.47	-13.00	62.47	Horizontal
256.846667	-86.80	-13.00	73.80	Horizontal
1653.000000	-54.82	-13.00	41.82	Horizontal
3306.150000	-60.82	-13.00	47.82	Horizontal
4959.262500	-50.91	-13.00	37.91	Horizontal
8856.337500	-63.05	-13.00	50.05	Horizontal

7.1.1.1.2 Test Channel = 20525

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
63.786667	-80.61	-13.00	67.61	Vertical
333.940000	-85.08	-13.00	72.08	Vertical
1673.000000	-62.56	-13.00	49.56	Vertical
2583.000000	-58.49	-13.00	45.49	Vertical
5018.250000	-63.80	-13.00	50.80	Vertical
7933.012500	-63.14	-13.00	50.14	Vertical
62.246667	-76.75	-13.00	63.75	Horizontal
269.820000	-86.18	-13.00	73.18	Horizontal
1673.000000	-52.37	-13.00	39.37	Horizontal
3345.637500	-60.93	-13.00	47.93	Horizontal
5018.250000	-53.05	-13.00	40.05	Horizontal
9222.937500	-62.22	-13.00	49.22	Horizontal



Unless otherwise agreed in writing, this document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <http://www.sgs.com/en/Terms-and-Conditions/Terms-e-Document.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

Attention: To check the authenticity of testing / inspection report & certificate, please contact us at telephone: (86-755) 8307 1443, or email: CN.Doccheck@sgs.com
 No.1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, China 518057 t (86-755) 26012053 f (86-755) 26710594 www.sgsgroup.com.cn
 中国·深圳·科技园中区M-10栋一号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com



7.1.1.1.3 Test Channel = 20649

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
64.533333	-80.43	-13.00	67.43	Vertical
336.506667	-84.85	-13.00	71.85	Vertical
1693.000000	-61.99	-13.00	48.99	Vertical
2582.000000	-58.48	-13.00	45.48	Vertical
4305.037500	-65.84	-13.00	52.84	Vertical
8099.250000	-63.24	-13.00	50.24	Vertical
62.340000	-75.88	-13.00	62.88	Horizontal
277.520000	-85.49	-13.00	72.49	Horizontal
1693.000000	-54.02	-13.00	41.02	Horizontal
3385.612500	-60.95	-13.00	47.95	Horizontal
5079.187500	-59.59	-13.00	46.59	Horizontal
7963.237500	-62.64	-13.00	49.64	Horizontal

NOTE:

- 1) The disturbance below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.
- 2) only the worst case data presented in this report.



8 Frequency Stability

8.1 Frequency Error VS. Voltage

BAND	Band width	Modulation	Channel	Number of T	Voltage [Vdc]	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
NB1 Band 5	180KHz	BPSK/15KHz	20401	12T0	VL	TN	1.71	0.002081	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20401	12T0	VN	TN	-10.28	-0.012480	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20401	12T0	VH	TN	-9.95	-0.012075	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20525	12T0	VL	TN	3.22	0.003846	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20525	12T0	VN	TN	7.72	0.009230	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20525	12T0	VH	TN	6.45	0.007710	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20649	12T0	VL	TN	9.32	0.010976	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20649	12T0	VN	TN	-7.62	-0.008981	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20649	12T0	VH	TN	-4.53	-0.005331	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20401	12T0	VL	TN	3.82	0.004639	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20401	12T0	VN	TN	-13.11	-0.015911	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20401	12T0	VH	TN	-2.37	-0.002877	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20525	12T0	VL	TN	-5.68	-0.006794	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20525	12T0	VN	TN	-4.51	-0.005391	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20525	12T0	VH	TN	-4.18	-0.004999	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20649	12T0	VL	TN	-1.82	-0.002143	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20649	12T0	VN	TN	9.62	0.011334	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20649	12T0	VH	TN	7.75	0.009131	±2.5	PASS

8.2 Frequency Error VS. Temperature

BAND	Band width	Modulation	Channel	Number of T	Voltage [Vdc]	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
NB1 Band 5	180KHz	BPSK/15KHz	20401	12T0	NV	-30	-5.40	-0.006550	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20401	12T0	NV	-20	12.08	0.014662	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20401	12T0	NV	0	-9.10	-0.011044	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20401	12T0	NV	10	10.00	0.012129	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20401	12T0	NV	20	11.62	0.014097	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20401	12T0	NV	30	-7.55	-0.009157	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20401	12T0	NV	40	14.38	0.017452	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20401	12T0	NV	50	11.63	0.014107	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20525	12T0	NV	-30	-5.97	-0.007133	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20525	12T0	NV	-20	-8.00	-0.009565	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20525	12T0	NV	0	4.79	0.005722	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20525	12T0	NV	10	13.01	0.015554	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20525	12T0	NV	20	-3.08	-0.003677	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20525	12T0	NV	30	3.95	0.004719	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20525	12T0	NV	40	-7.13	-0.008520	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20525	12T0	NV	50	14.52	0.017363	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20649	12T0	NV	-30	13.57	0.015987	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20649	12T0	NV	-20	-5.68	-0.006686	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20649	12T0	NV	0	-0.88	-0.001040	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20649	12T0	NV	10	1.98	0.002331	±2.5	PASS



Unless otherwise agreed in writing, this document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <http://www.sgs.com/en/Terms-and-Conditions/Terms-e-Documents.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

Attention: To check the authenticity of testing / inspection report & certificate, please contact us at telephone: (86-755) 8307 1443, or email: CN.Doccheck@sgs.com
 No.1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, China 518057 t (86-755) 26012053 f (86-755) 26710594 www.sgsgroup.com.cn
 中国·深圳·科技园中区M-10栋一号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com



NB1 Band 5	180KHz	BPSK/15KHz	20649	12T0	NV	20	-6.83	-0.008051	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20649	12T0	NV	30	1.09	0.001289	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20649	12T0	NV	40	0.24	0.000286	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20649	12T0	NV	50	1.31	0.001547	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20401	12T0	NV	-30	9.11	0.011057	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20401	12T0	NV	-20	1.93	0.002347	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20401	12T0	NV	0	-10.71	-0.012994	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20401	12T0	NV	10	3.43	0.004157	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20401	12T0	NV	20	8.65	0.010500	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20401	12T0	NV	30	5.59	0.006786	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20401	12T0	NV	40	-2.83	-0.003435	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20401	12T0	NV	50	5.80	0.007035	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20525	12T0	NV	-30	5.21	0.006233	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20525	12T0	NV	-20	12.43	0.014860	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20525	12T0	NV	0	0.64	0.000767	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20525	12T0	NV	10	7.96	0.009512	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20525	12T0	NV	20	13.63	0.016288	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20525	12T0	NV	30	-5.73	-0.006846	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20525	12T0	NV	40	-13.02	-0.015566	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20525	12T0	NV	50	-9.02	-0.010786	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20649	12T0	NV	-30	-7.42	-0.008746	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20649	12T0	NV	-20	4.76	0.005609	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20649	12T0	NV	0	14.30	0.016844	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20649	12T0	NV	10	-6.77	-0.007975	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20649	12T0	NV	20	-10.67	-0.012566	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20649	12T0	NV	30	11.93	0.014049	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20649	12T0	NV	40	-1.65	-0.001938	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20649	12T0	NV	50	-12.58	-0.014820	±2.5	PASS

The End



Unless otherwise agreed in writing, this document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <http://www.sgs.com/en/Terms-and-Conditions/Terms-e-Documents.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

Attention: To check the authenticity of testing / inspection report & certificate, please contact us at telephone: (86-755) 8307 1443, or email: CN.Doccheck@sgs.com
No.1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, China 518057 t (86-755) 26012053 f (86-755) 26710594 www.sgsgroup.com.cn
中国·深圳·科技园中区M-10栋一号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com