



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

Telephone: +86 (0) 755 2601 2053

Fax: +86 (0) 755 2671 0594

Email: sgs_internet_operations@sgs.com

Report No.: SZEM110700255401

Page : 1 of 26

FCC REPORT

Application No. : SZEM1107002554RF
Applicant: SHANTOU BENMA HOBBY INDUSTRIAL CO., LTD.
Product Name: 2.4GHz TX FOR R/C HELICOPTER
Operation Frequency: 2404.8MHz to 2479.8MHz
FCC ID: ZWR86988889123
Standards: FCC CFR Title 47 Part 15 Subpart C Section 15.249: 2010
Date of Receipt 2011-07-28
Date of Test 2011-07-28 to 2011-08-16
Date of Issue 2011-08-18

Test Result :	PASS *
----------------------	---------------

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Jack Zhang
EMC Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

This Test Report is issued by the Company subject to its General Conditions of Service printed overleaf. Attention is drawn to the limitations of liability, indemnification and jurisdictional issues defined therein. The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This Test Report cannot be reproduced, except in full, without prior written permission of the Company.



SGS-CSTC Standards Technical Services Ltd.

Report No.: SZEM110700255401

Page : 2 of 26

2 Contents

	Page
1 COVER PAGE	1
2 CONTENTS	2
3 TEST SUMMARY	3
4 GENERAL INFORMATION.....	4
4.1 CLIENT INFORMATION.....	4
4.2 GENERAL DESCRIPTION OF E.U.T.....	4
4.3 E.U.T OPERATION MODE	5
4.4 TEST FACILITY	5
4.5 TEST LOCATION	5
4.6 OTHER INFORMATION REQUESTED BY THE CUSTOMER	5
4.7 TEST INSTRUMENTS LIST:	6
5 TEST RESULTS AND MEASUREMENT DATA.....	7
5.1 ANTENNA REQUIREMENT:.....	7
5.2 RADIATED EMISSION.....	8
5.2.1 Field Strength Of The Fundamental Signal.....	10
5.2.2 Spurious Emissions.....	11
5.2.3 Band edge (Radiated Emission).....	16
5.3 20DB BANDWIDTH.....	24-26

"This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at www.sgs.com/terms_and_conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at www.sgs.com/terms_e-document.htm. 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 90 days only."



SGS-CSTC Standards Technical Services Ltd.

Report No.: SZEM110700255401

Page : 3 of 26

3 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203	Pass
Field strength of the fundamental signal	15.249 (a)	Pass
Spurious emissions	15.249 (a)/15.209	Pass
Band edge (Radiated Emission)	15.249(a)/15.205	Pass
20dB Occupied Bandwidth	15.215 (c)	Pass

Remark: Pass: The EUT complies with the essential requirements in the standard.

Fail: The EUT does not comply with the essential requirements in the standard.



4 General Information

4.1 Client Information

Applicant:	SHANTOU BENMA HOBBY INDUSTRIAL CO., LTD.
Address of Applicant:	YUTAN ROAD, GUANGYI STREET, CHENGHAI DISTRICT, SHANTOU CITY, GUANGDONG PROVINCE, CHINA

4.2 General Description of E.U.T.

Product Name:	2.4GHz TX FOR R/C HELICOPTER		
Model No.:	AZSH1100B AZSH1100R 9988 9958 9978 9998 8830 8831 8829 6031 6032 6033 6034 6035 6036 9108 9109 9110 9111 9112 9113 9114 9115 9116 9117 9118 9119 9120 9121 9122 Only the model 9988 was tested, since the electrical circuit design, layout, components used and internal wiring were identical for the above models, with difference being the decoration, colours and the model No..		
Operation Frequency:	2404.8MHz to 2479.8MHz		
Channel numbers:	16		
Modulation type:	GFSK		
Antenna Type:	Integral		
Power supply:	6.0V DC (4 x 1.5V "AA" Size Batteries)		
Channel number	Frequency(MHz)	Channel number	Frequency(MHz)
CH 00	2404.8	CH 08	2444.8
CH 01	2409.8	CH 09	2449.8
CH 02	2414.8	CH 10	2454.8
CH 03	2419.8	CH 11	2459.8
CH 04	2424.8	CH 12	2464.8
CH 05	2429.8	CH 13	2469.8
CH 06	2434.8	CH 14	2474.8
CH 07	2439.8	CH 15	2479.8

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The lowest channel	2404.8MHz
The middle channel	2439.8MHz
The Highest channel	2479.8MHz



4.3 E.U.T Operation mode

Operating Environment:

Temperature: 24.0 °C
Humidity: 51 % RH
Atmospheric Pressure: 1004 mbar

Test mode:

Transmitting mode: Keep the EUT in Transmitting mode.

4.4 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L2929)**
CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.
- **VCCI**
The 3m Semi-anechoic chamber and Shielded Room (7.5m x 4.0m x 3.0m) of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-2197 and C-2383 respectively.
Date of Registration: September 29, 2008. Valid until September 28, 2011.
- **FCC – Registration No.: 556682**
SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 556682, March 16, 2011
- **Industry Canada (IC)**
The 3m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1.

4.5 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch E&E Lab
No. 1 Workshop, M-10, Middle section, Science & Technology Park, Shenzhen, Guangdong, China
518057
Telephone: +86 (0) 755 2601 2053 Fax: +86 (0) 755 2671 0594
No tests were sub-contracted.

4.6 Other Information Requested by the Customer

None.



SGS-CSTC Standards Technical Services Ltd.

Report No.: SZEM110700255401

Page : 6 of 26

4.7 Test Instruments list:

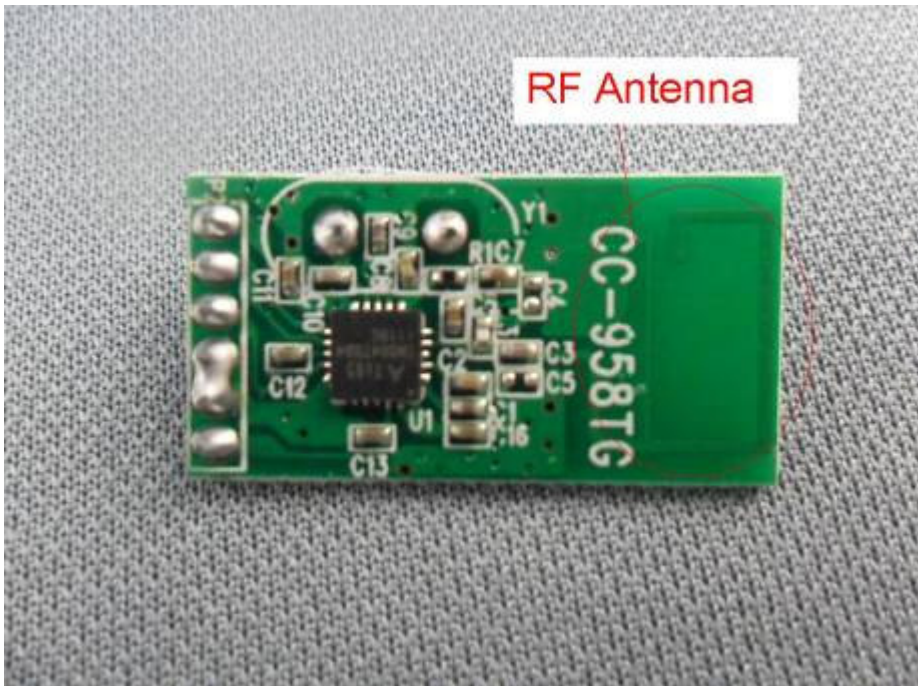
RE in Chamber						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (yyyy-mm-dd)	Cal.Due date (yyyy-mm-dd)
1	3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEL0017	2011-06-10	2012-06-10
2	EMI Test Receiver	Rohde & Schwarz	ESIB26	SEL0023	2011-05-26	2012-05-26
3	EMI Test software	AUDIX	E3	SEL0050	N/A	N/A
4	Coaxial cable	SGS	N/A	SEL0028	2011-05-29	2012-05-29
5	BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEL0015	2010-11-09	2011-11-09
6	Double-ridged horn (1-18GHz)	ETS-LINDGREN	3117	SEL0006	2010-11-09	2011-11-09
7	Horn Antenna (18-26GHz)	ETS-LINDGREN	3160	SEL0076	2010-11-09	2011-11-09
8	Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEL0053	2011-05-26	2012-05-26
9	Pre-Amplifier (0.1-26.5GHz)	Compliance Directions Systems Inc.	PAP-0126	SEL0168	2010-10-27	2011-10-27
11	Band filter	Amindeon	82346	SEL0094	2011-05-26	2012-05-26

General used equipment						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (yyyy-mm-dd)	Cal.Due date (yyyy-mm-dd)
1	Humidity/ Temperature Indicator	Shanghai	ZJ1-2B	SEL0102 to SEL0103	2010-11-04	2011-11-04
2	Humidity/ Temperature Indicator	Shanghai	ZJ1-2B	SEL0101	2011-03-10	2012-03-10
3	Barometer	ChangChun	DYM3	SEL0088	2011-05-18	2012-05-18
4	Oscillograph	Tektronix	TDS2022B	SZE007-4	2010-12-04	2011-12-04

"This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at www.sgs.com/terms_and_conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at www.sgs.com/terms_e-document.htm. 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 90 days only."

5 Test results and Measurement Data

5.1 Antenna requirement:

Standard requirement:	FCC Part15 C Section 15.203
15.203 requirement: <i>An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.</i>	
E.U.T Antenna:	
	



SGS-CSTC Standards Technical Services Ltd.

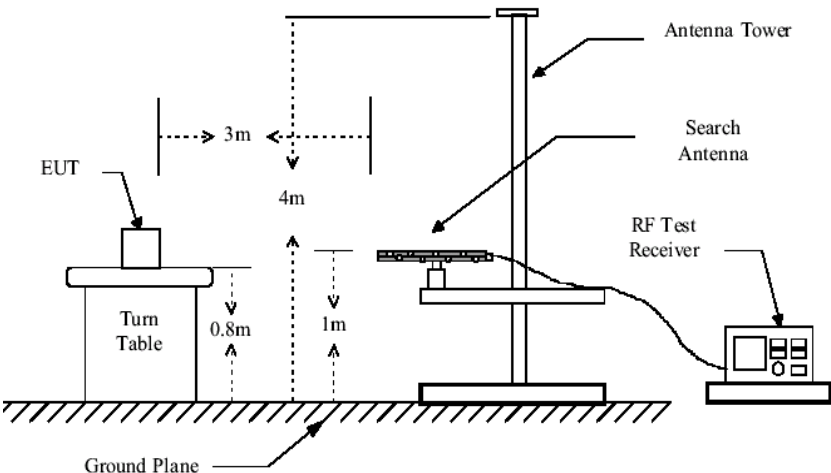
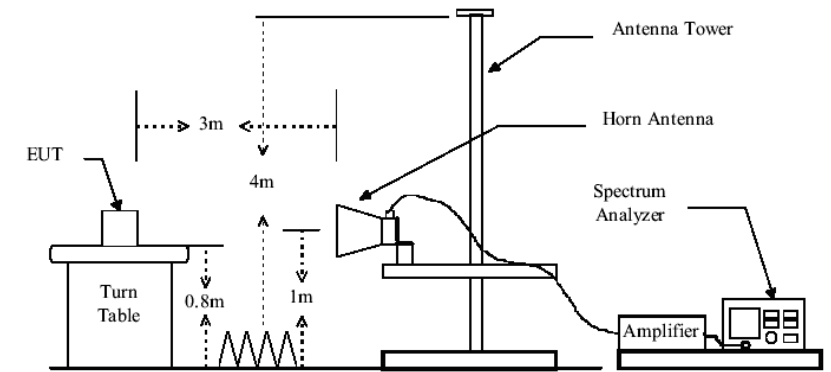
Report No.: SZEM110700255401

Page : 8 of 26

5.2 Radiated Emission

Test Requirement:	FCC Part15 C Section 15.249 and 15.209				
Test Method:	ANSI C63.10: 2009				
Test Frequency Range:	30MHz to 25000MHz				
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)				
Receiver setup:					
	Frequency	Detector	RBW	VBW	Remark
	30MHz-1GHz	Quasi-peak	100kHz	300kHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
Peak		1MHz	10Hz	Average Value	
Limit: (Field strength of the fundamental signal)					
	Frequency		Limit (dBuV/m @3m)	Remark	
	2400MHz-2483.5MHz		94.0	Average Value	
114.0			Peak Value		
Limit: (Spurious Emissions)					
	Frequency		Limit (dBuV/m @3m)	Remark	
	30MHz-88MHz		40.0	Quasi-peak Value	
	88MHz-216MHz		43.5	Quasi-peak Value	
	216MHz-960MHz		46.0	Quasi-peak Value	
	960MHz-1GHz		54.0	Quasi-peak Value	
	Above 1GHz	54.0	Average Value		
74.0		Peak Value			
Limit: (band edge)	Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.				
Test Procedure:	<p>a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.</p> <p>b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</p> <p>c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.</p> <p>d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.</p> <p>e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</p> <p>f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported</p>				

"This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at www.sgs.com/terms_and_conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at www.sgs.com/terms_e-document.htm. 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 90 days only."

	in a data sheet.
Test Instruments:	Refer to section 4.7 for details.
Test setup:	<p>Below 1GHz</p>  <p>Above 1GHz</p> 
Test mode:	Transmitting mode
Test results:	Pass

Note:

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

$$\text{Final Test Level} = \text{Receiver Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Preamplifier Factor}$$



SGS-CSTC Standards Technical Services Ltd.

Report No.: SZEM110700255401

Page : 10 of 26

Measurement Data

5.2.1 Field Strength Of The Fundamental Signal

Peak value:

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2404.800	2.98	32.51	39.86	94.46	90.09	114.00	-23.91	Horizontal
2404.800	2.98	32.51	39.86	95.14	90.77	114.00	-23.23	Vertical
2439.800	3.01	32.61	39.89	95.12	90.85	114.00	-23.15	Horizontal
2439.800	3.01	32.61	39.89	94.74	90.47	114.00	-23.53	Vertical
2479.800	3.03	32.67	39.92	93.18	88.96	114.00	-25.04	Horizontal
2479.800	3.03	32.67	39.92	94.19	89.97	114.00	-24.03	Vertical

Average value:

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2404.800	2.98	32.54	39.86	89.41	85.07	94.00	-8.93	Horizontal
2404.800	2.98	32.54	39.86	89.14	84.80	94.00	-9.20	Vertical
2439.800	3.01	32.61	39.89	92.53	88.26	94.00	-5.74	Horizontal
2439.800	3.01	32.61	39.89	92.76	88.49	94.00	-5.51	Vertical
2479.800	3.03	32.67	39.92	92.95	88.73	94.00	-5.27	Horizontal
2479.800	3.03	32.67	39.92	89.35	85.13	94.00	-8.87	Vertical

Note:

Peak Level (Final Level)= Reading Level + Antenna Factor + Cable Loss - Preamp Factor

"This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at www.sgs.com/terms_and_conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at www.sgs.com/terms_e-document.htm. 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 90 days only."



SGS-CSTC Standards Technical Services Ltd.

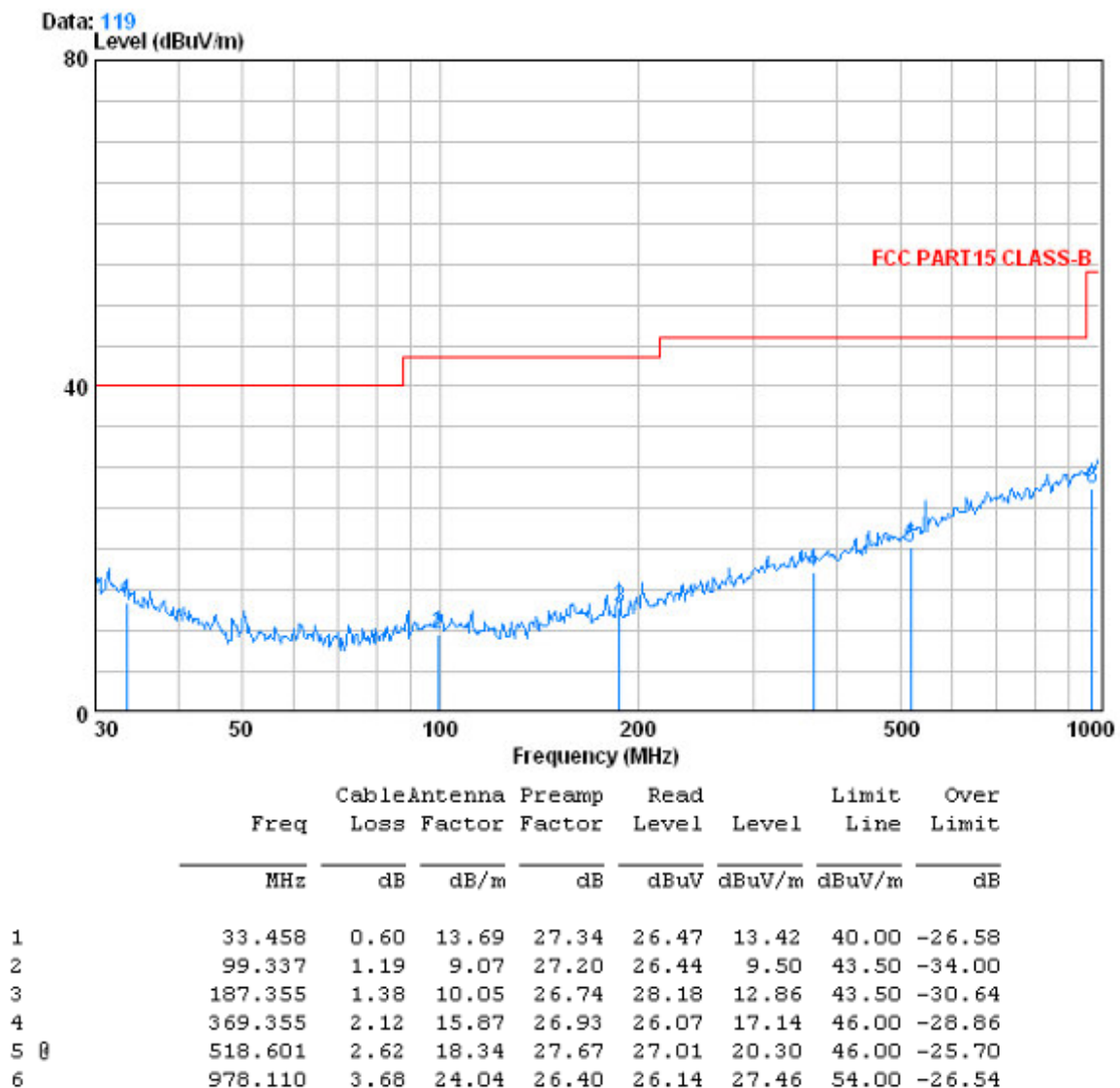
Report No.: SZEM110700255401

Page : 11 of 26

5.2.2 Spurious Emissions

30MHz~1GHz

Horizontal:



"This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at www.sgs.com/terms_and_conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at www.sgs.com/terms_e-document.htm. 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 90 days only."

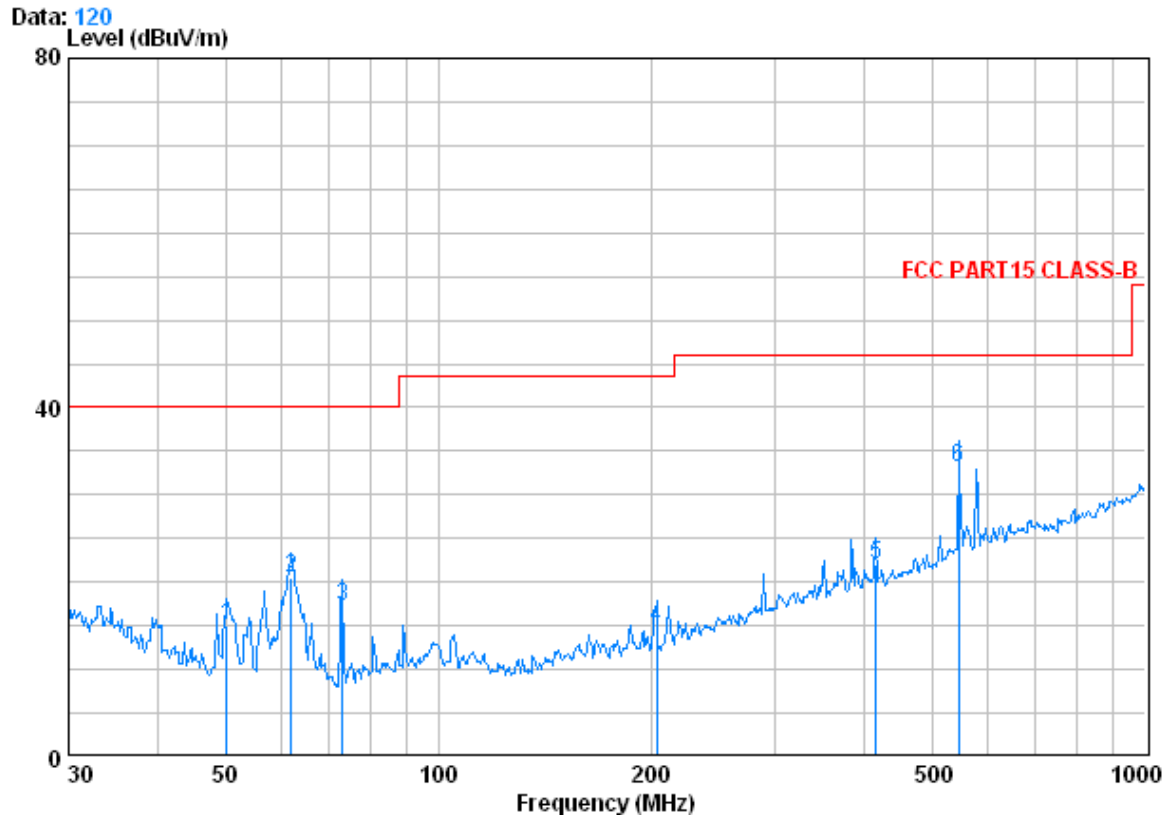


SGS-CSTC Standards Technical Services Ltd.

Report No.: SZEM110700255401

Page : 12 of 26

Vertical:



		CableAntenna Preampl			Read		Limit	Over
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 @	50.232	0.80	7.98	27.29	33.65	15.14	40.00	-24.86
2 @	61.995	0.80	7.14	27.26	39.75	20.42	40.00	-19.58
3 @	73.103	0.90	7.17	27.24	36.47	17.30	40.00	-22.70
4	203.523	1.42	10.36	26.69	29.73	14.83	43.50	-28.67
5 @	416.179	2.27	16.36	27.23	30.62	22.02	46.00	-23.98
6 @	545.183	2.65	18.84	27.63	39.33	33.19	46.00	-12.81

"This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at www.sgs.com/terms_and_conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at www.sgs.com/terms_e-document.htm. 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 90 days only."



SGS-CSTC Standards Technical Services Ltd.

Report No.: SZEM110700255401

Page : 13 of 26

Above 1GHz								
Test mode:		Transmitting		Test channel:		Lowest		Remark:
Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamplifier Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
1458.250	2.49	28.04	39.33	46.63	37.83	74.00	-36.17	Vertical
2316.000	2.96	32.36	39.79	46.91	42.44	74.00	-31.56	Vertical
3326.500	3.59	33.27	40.54	49.10	45.42	74.00	-28.58	Vertical
4783.500	4.68	34.73	41.61	70.37	68.17	74.00	-5.83	Vertical
6898.500	5.43	35.90	40.15	49.68	50.86	74.00	-23.14	Vertical
10094.500	6.00	37.82	37.49	45.44	51.77	74.00	-22.23	Vertical
1434.750	2.48	28.01	39.33	46.47	37.63	74.00	-36.37	Horizontal
2327.750	2.96	32.39	39.81	47.03	42.57	74.00	-31.43	Horizontal
4783.500	4.68	34.73	41.61	67.35	65.15	74.00	-8.85	Horizontal
6522.500	5.26	36.28	40.46	49.48	50.56	74.00	-23.44	Horizontal
8931.250	6.16	36.55	38.39	47.44	51.76	74.00	-22.24	Horizontal
11504.500	6.34	38.40	38.07	46.25	52.92	74.00	-21.08	Horizontal

Test mode:		Transmitting		Test channel:		Lowest		Remark:
Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamplifier Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
1458.250	2.49	28.04	39.33	35.24	26.44	54.00	-27.56	Vertical
2316.000	2.96	32.36	39.79	35.91	31.44	54.00	-22.56	Vertical
3326.500	3.59	33.27	40.54	37.43	33.75	54.00	-20.25	Vertical
4783.500	4.68	34.73	41.61	51.37	49.17	54.00	-4.83	Vertical
6898.500	5.43	35.90	40.15	38.68	39.86	54.00	-14.14	Vertical
10082.750	5.99	37.80	37.48	35.62	41.93	54.00	-12.07	Vertical
1434.750	2.48	28.01	39.33	31.25	22.41	54.00	-31.59	Horizontal
2327.750	2.96	32.39	39.81	34.15	29.69	54.00	-24.31	Horizontal
4783.500	4.68	34.73	41.61	48.35	46.15	54.00	-7.85	Horizontal
6522.500	5.26	36.28	40.46	38.35	39.43	54.00	-14.57	Horizontal
8931.250	6.16	36.55	38.39	34.44	38.76	54.00	-15.24	Horizontal
11504.500	6.34	38.40	38.07	39.85	46.52	54.00	-7.48	Horizontal

"This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at www.sgs.com/terms_and_conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at www.sgs.com/terms_e-document.htm. 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 90 days only."



SGS-CSTC Standards Technical Services Ltd.

Report No.: SZEM110700255401

Page : 14 of 26

Test mode:	Transmitting	Test channel:	Middle	Remark:	Peak
------------	--------------	---------------	--------	---------	------

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamplifier Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
1258.500	2.36	27.67	39.25	47.46	38.24	74.00	-35.76	Vertical
2010.500	2.84	31.80	39.57	47.31	42.38	74.00	-31.62	Vertical
3244.250	3.52	33.30	40.48	48.22	44.56	74.00	-29.44	Vertical
4936.250	4.75	34.48	41.72	66.24	63.75	74.00	-10.25	Vertical
7991.250	6.21	36.00	39.20	49.06	52.07	74.00	-21.93	Vertical
10752.500	6.16	38.40	37.76	45.85	52.65	74.00	-21.35	Vertical
1505.250	2.52	28.22	39.36	47.62	39.00	74.00	-35.00	Horizontal
3620.250	3.84	33.34	40.76	48.59	45.01	74.00	-28.99	Horizontal
4936.250	4.75	34.48	41.72	69.56	67.07	74.00	-6.93	Horizontal
6675.250	5.30	36.13	40.33	49.55	50.65	74.00	-23.35	Horizontal
8884.250	6.16	36.51	38.42	47.11	51.36	74.00	-22.64	Horizontal
11892.250	6.44	38.80	38.23	47.15	54.16	74.00	-19.84	Horizontal

Test mode:	Transmitting	Test channel:	Middle	Remark:	Average
------------	--------------	---------------	--------	---------	---------

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamplifier Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
1258.500	2.36	27.67	39.25	33.24	24.02	54.00	-29.98	Vertical
2010.500	2.84	31.80	39.57	33.31	28.38	54.00	-25.62	Vertical
3244.250	3.52	33.30	40.48	38.65	34.99	54.00	-19.01	Vertical
4936.250	4.75	34.48	41.72	50.68	48.19	54.00	-5.81	Vertical
7991.250	6.21	36.00	39.20	36.06	39.07	54.00	-14.93	Vertical
10752.500	6.16	38.40	37.76	36.24	43.04	54.00	-10.96	Vertical
1505.250	2.52	28.22	39.36	33.62	25.00	54.00	-29.00	Horizontal
3620.250	3.84	33.34	40.76	37.35	33.77	54.00	-20.23	Horizontal
4936.250	4.75	34.48	41.72	51.26	48.77	54.00	-5.23	Horizontal
6675.250	5.30	36.13	40.33	38.55	39.65	54.00	-14.35	Horizontal
8884.250	6.16	36.51	38.42	36.11	40.36	54.00	-13.64	Horizontal
11892.250	6.44	38.80	38.23	37.42	44.43	54.00	-9.57	Horizontal

"This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at www.sgs.com/terms_and_conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at www.sgs.com/terms_e-document.htm. 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 90 days only."



SGS-CSTC Standards Technical Services Ltd.

Report No.: SZEM110700255401

Page : 15 of 26

Test mode:	Transmitting	Test channel:	Highest	Remark:	Peak
------------	--------------	---------------	---------	---------	------

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamplifier Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
1258.500	2.36	27.67	39.25	47.46	38.24	74.00	-35.76	Vertical
2010.500	2.84	31.80	39.57	47.31	42.38	74.00	-31.62	Vertical
3244.250	3.52	33.30	40.48	48.22	44.56	74.00	-29.44	Vertical
4936.250	4.75	34.48	41.72	66.24	63.75	74.00	-10.25	Vertical
7991.250	6.21	36.00	39.20	49.06	52.07	74.00	-21.93	Vertical
10752.500	6.16	38.40	37.76	45.85	52.65	74.00	-21.35	Vertical
1505.250	2.52	28.22	39.36	47.62	39.00	74.00	-35.00	Horizontal
3620.250	3.84	33.34	40.76	48.59	45.01	74.00	-28.99	Horizontal
4936.250	4.75	34.48	41.72	69.56	67.07	74.00	-6.93	Horizontal
6675.250	5.30	36.13	40.33	49.55	50.65	74.00	-23.35	Horizontal
8884.250	6.16	36.51	38.42	47.11	51.36	74.00	-22.64	Horizontal
11892.250	6.44	38.80	38.23	47.15	54.16	74.00	-19.84	Horizontal

Test mode:	Transmitting	Test channel:	Highest	Remark:	Average
------------	--------------	---------------	---------	---------	---------

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamplifier Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
1258.500	2.36	27.67	39.25	33.24	24.02	54.00	-29.98	Vertical
2010.500	2.84	31.80	39.57	33.31	28.38	54.00	-25.62	Vertical
3244.250	3.52	33.30	40.48	38.65	34.99	54.00	-19.01	Vertical
4936.250	4.75	34.48	41.72	50.68	48.19	54.00	-5.81	Vertical
7991.250	6.21	36.00	39.20	36.06	39.07	54.00	-14.93	Vertical
10752.500	6.16	38.40	37.76	36.24	43.04	54.00	-10.96	Vertical
1505.250	2.52	28.22	39.36	33.62	25.00	54.00	-29.00	Horizontal
3620.250	3.84	33.34	40.76	37.35	33.77	54.00	-20.23	Horizontal
4936.250	4.75	34.48	41.72	51.26	48.77	54.00	-5.23	Horizontal
6675.250	5.30	36.13	40.33	38.55	39.65	54.00	-14.35	Horizontal
8884.250	6.16	36.51	38.42	36.11	40.36	54.00	-13.64	Horizontal
11892.250	6.44	38.80	38.23	37.42	44.43	54.00	-9.57	Horizontal

"This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at www.sgs.com/terms_and_conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at www.sgs.com/terms_e-document.htm. 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 90 days only."



SGS-CSTC Standards Technical Services Ltd.

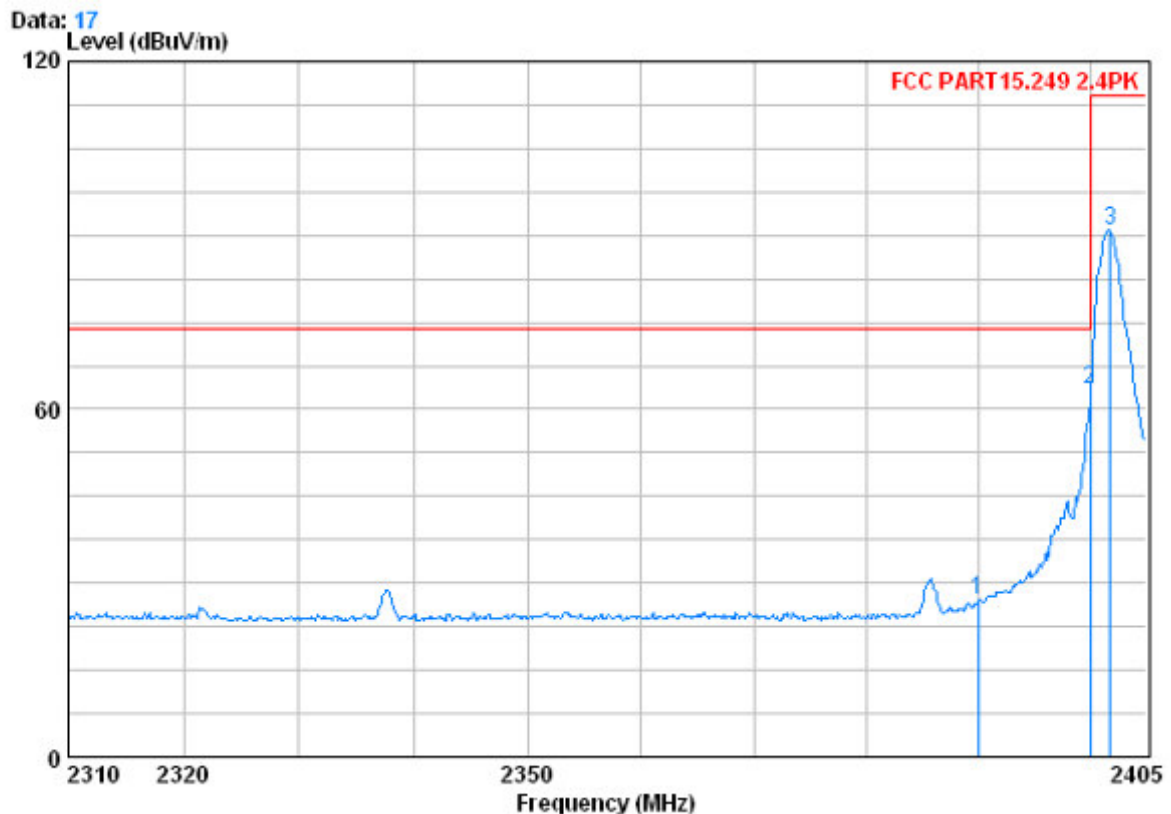
Report No.: SZEM110700255401

Page : 16 of 26

5.2.3 Band edge (Radiated Emission)

Test mode:	Transmitting	Test channel:	Lowest	Remark:	Peak
------------	--------------	---------------	--------	---------	------

Vertical:



		Cable&Antenna Preamp			Read		Limit	Over
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2390.000	2.98	32.51	39.85	31.52	27.17	74.00	-46.83
2 @	2400.000	2.98	32.51	39.86	67.77	63.40	74.00	-10.60
3 @	2401.770	2.98	32.51	39.86	95.14	90.77	114.00	-23.23

"This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at www.sgs.com/terms_and_conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at www.sgs.com/terms_e-document.htm. 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 90 days only."

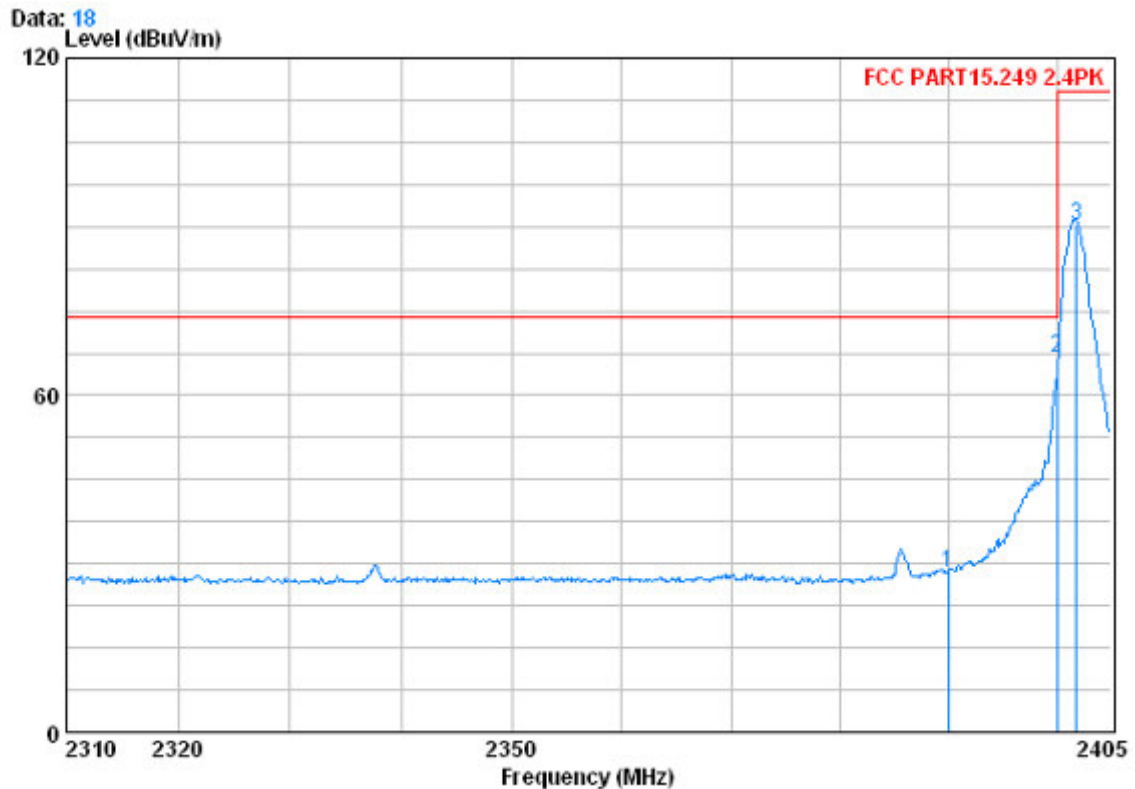


SGS-CSTC Standards Technical Services Ltd.

Report No.: SZEM110700255401

Page : 17 of 26

Horizontal:



	Freq	Cable Loss	Antenna Factor	Preamp Factor	Read Level	Level	Limit	Over
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2390.000	2.98	32.51	39.85	32.86	28.51	74.00	-45.49
2 @	2400.000	2.98	32.51	39.86	71.10	66.73	74.00	-7.27
3	2401.770	2.98	32.51	39.86	94.46	90.09	114.00	-23.91

"This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at www.sgs.com/terms_and_conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at www.sgs.com/terms_e-document.htm. 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 90 days only."



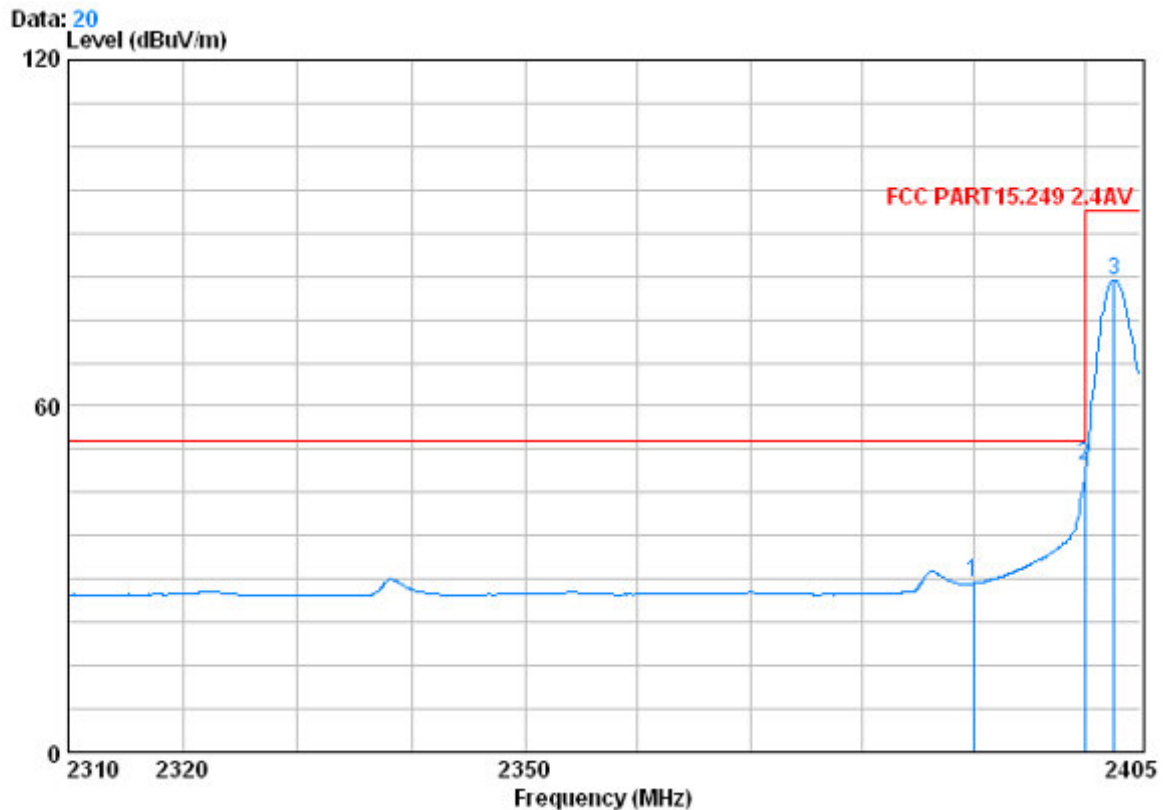
SGS-CSTC Standards Technical Services Ltd.

Report No.: SZEM110700255401

Page : 18 of 26

Test mode:	Transmitting	Test channel:	Lowest	Remark:	Avarage
------------	--------------	---------------	--------	---------	---------

Vertical:



	Freq	CableAntenna Loss	Antenna Factor	Preamplifier Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2390.000	2.98	32.51	39.85	33.67	29.32	54.00	-24.68
2	2400.000	2.98	32.51	39.86	54.06	49.70	54.00	-4.30
3	2402.625	2.98	32.54	39.86	86.14	81.80	94.00	-12.20

"This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at www.sgs.com/terms_and_conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at www.sgs.com/terms_e-document.htm. 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 90 days only."

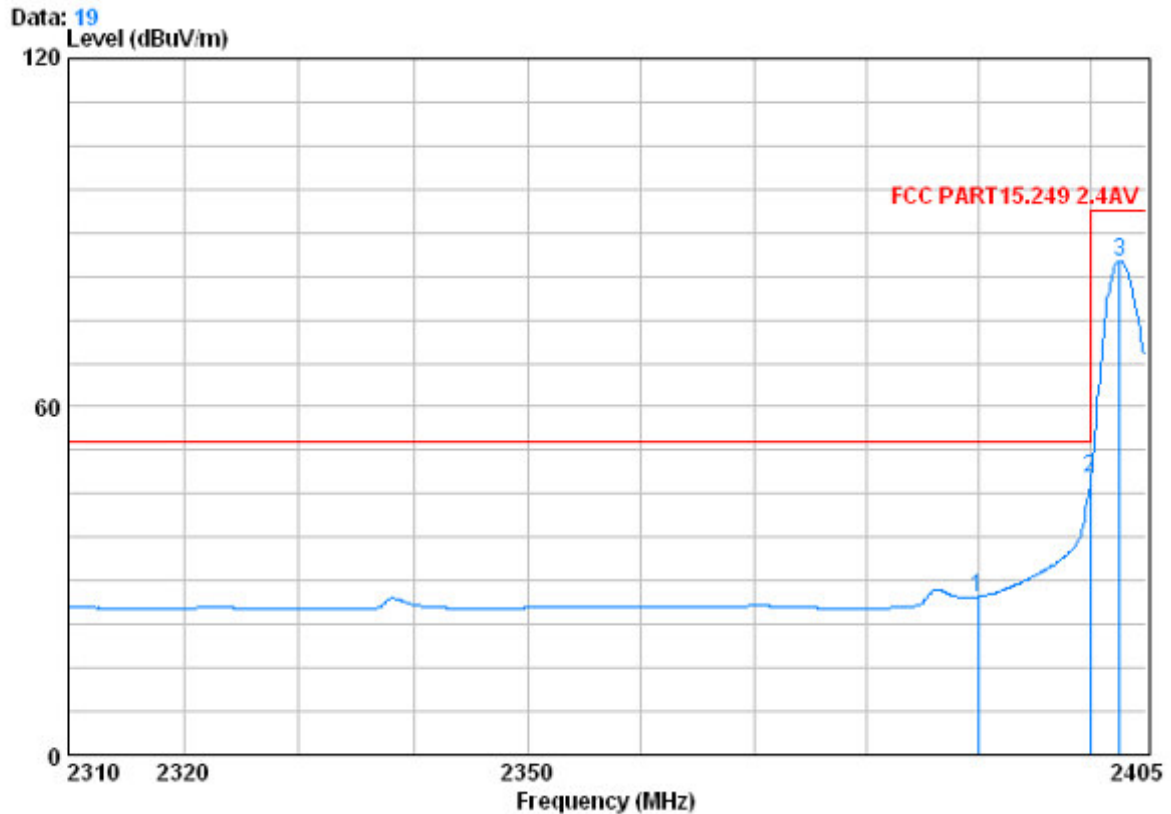


SGS-CSTC Standards Technical Services Ltd.

Report No.: SZEM110700255401

Page : 19 of 26

Horizontal:



		CableAntenna		Preamp	Read		Limit	Over
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2390.000	2.98	32.51	39.85	31.63	27.28	54.00	-26.72
2	2400.000	2.98	32.51	39.86	52.15	47.78	54.00	-6.22
3	2402.625	2.98	32.54	39.86	89.41	85.07	94.00	-8.93

"This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at www.sgs.com/terms_and_conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at www.sgs.com/terms_e-document.htm. 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 90 days only."



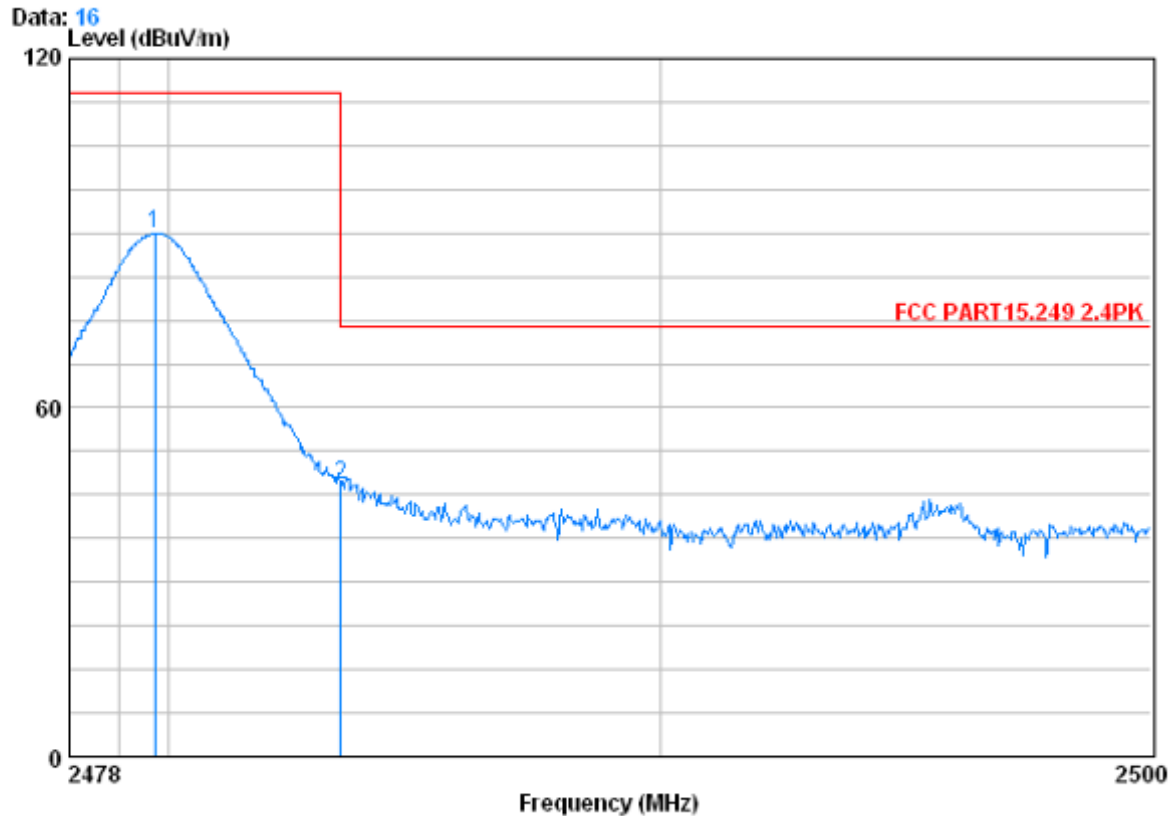
SGS-CSTC Standards Technical Services Ltd.

Report No.: SZEM110700255401

Page : 20 of 26

Test mode:	Transmitting	Test channel:	Highest	Remark:	Peak
------------	--------------	---------------	---------	---------	------

Vertical:



	Freq	Cable Loss	Antenna Factor	Preamplifier Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2479.738	3.03	32.67	39.92	94.19	89.97	114.00	-24.03
2	2483.500	3.03	32.67	39.92	50.87	46.65	74.00	-27.35

"This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at www.sgs.com/terms_and_conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at www.sgs.com/terms_e-document.htm. 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 90 days only."

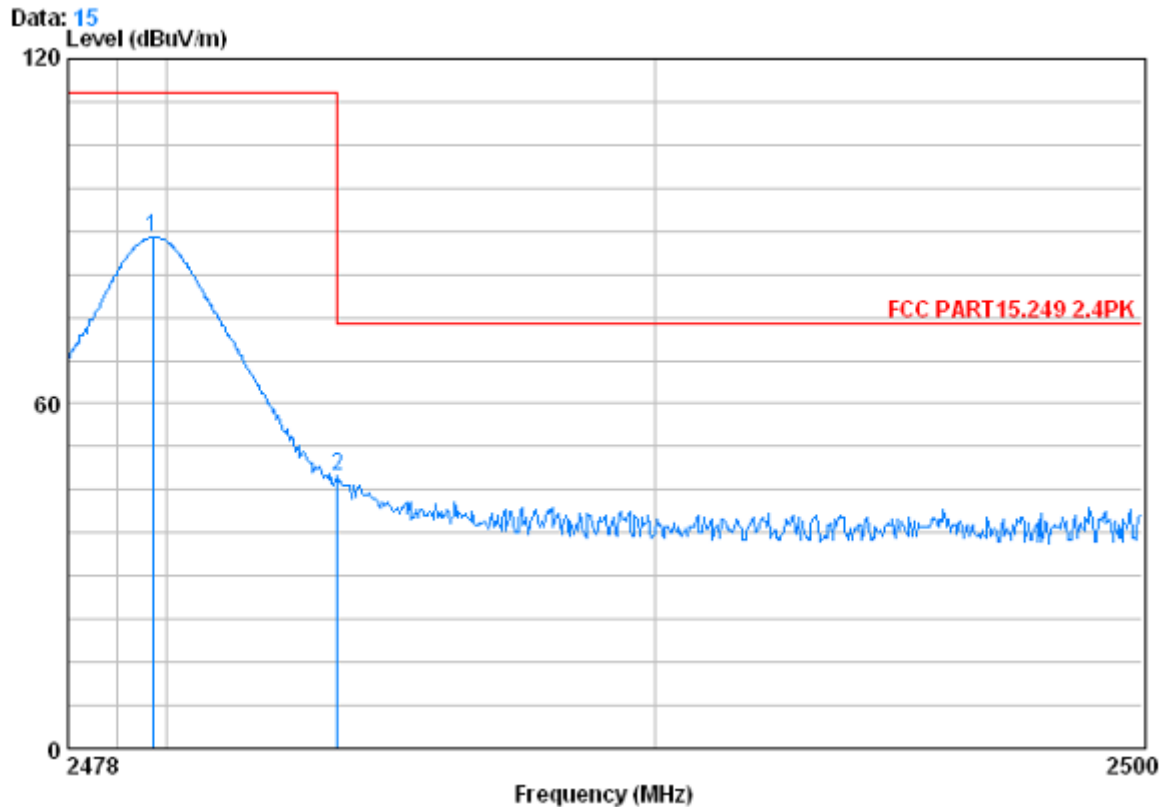


SGS-CSTC Standards Technical Services Ltd.

Report No.: SZEM110700255401

Page : 21 of 26

Horizontal:



	Freq	Cable Loss	Antenna Factor	Preamp Factor	Read Level	Level	Limit	Over
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2479.738	3.03	32.67	39.92	93.18	88.96	114.00	-25.04
2	2483.500	3.03	32.67	39.92	51.61	47.39	74.00	-26.61

"This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at www.sgs.com/terms_and_conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at www.sgs.com/terms_e-document.htm. 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 90 days only."



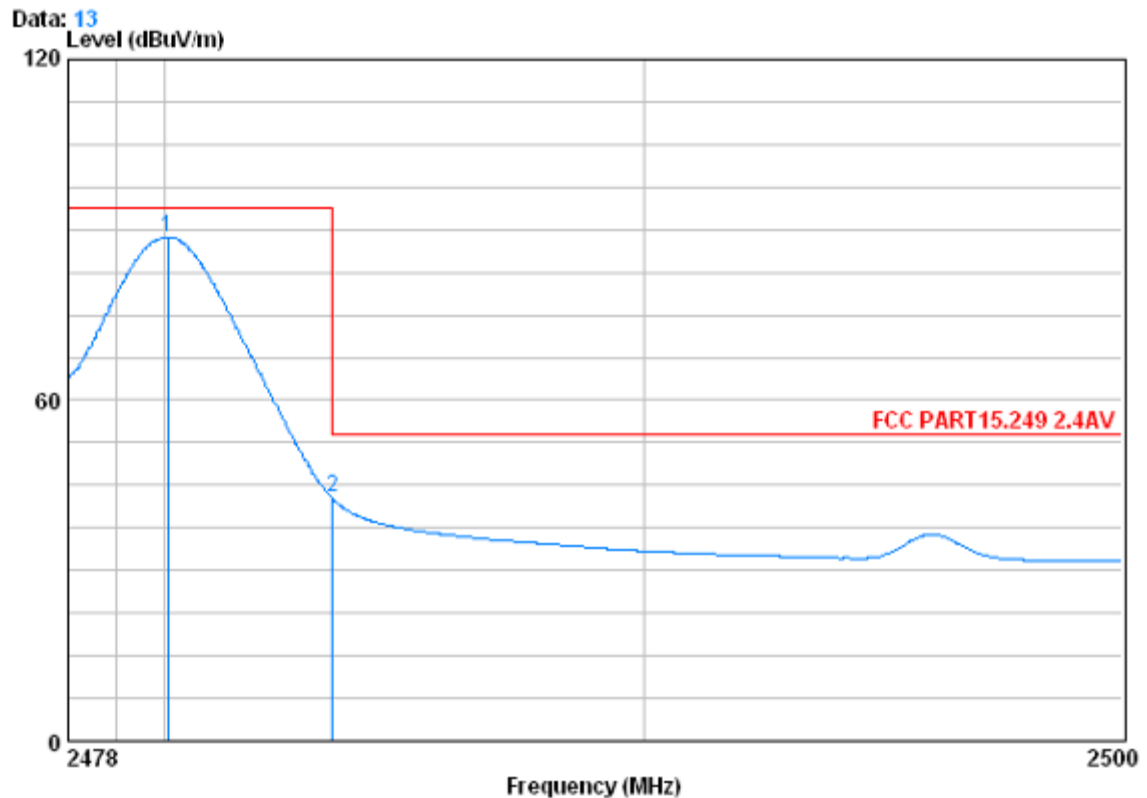
SGS-CSTC Standards Technical Services Ltd.

Report No.: SZEM110700255401

Page : 22 of 26

Test mode:	Transmitting	Test channel:	Highest	Remark:	Avarage
------------	--------------	---------------	---------	---------	---------

Vertical:



	Freq	CableAntenna Loss	Preamp Factor	Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 @	2480.068	3.03	32.67	39.92	92.95	88.73	94.00	-5.27
2 @	2483.500	3.03	32.67	39.92	46.98	42.76	54.00	-11.24

"This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at www.sgs.com/terms_and_conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at www.sgs.com/terms_e-document.htm. 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 90 days only."

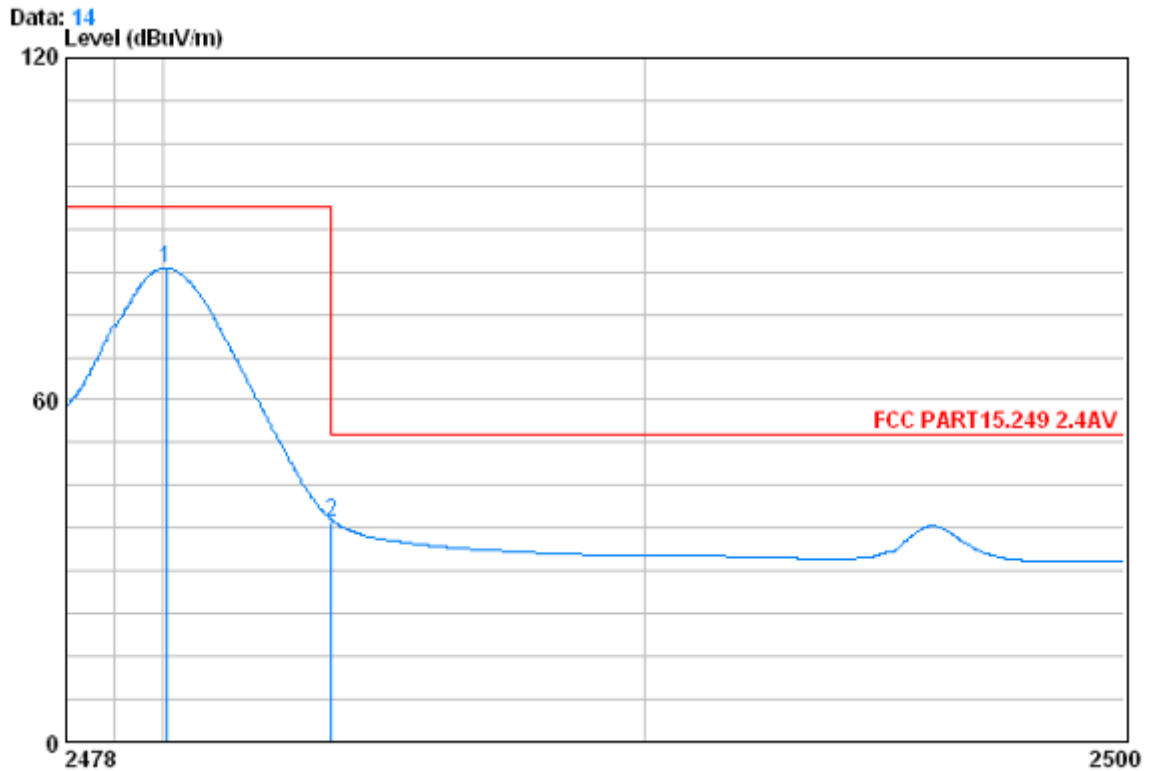


SGS-CSTC Standards Technical Services Ltd.

Report No.: SZEM110700255401

Page : 23 of 26

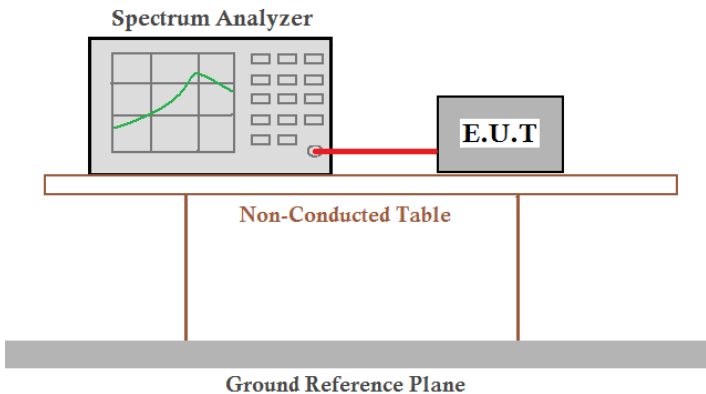
Horizontal:



Frequency (MHz)								
	CableAntenna	Preamp	Read	Limit	Over			
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 @	2480.068	3.03	32.67	39.92	87.35	83.13	94.00	-10.87
2 @	2483.500	3.03	32.67	39.92	42.90	38.68	54.00	-15.32

"This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at www.sgs.com/terms_and_conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at www.sgs.com/terms_e-document.htm. 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 90 days only."

5.3 20dB Bandwidth

Test Requirement:	FCC Part15 C Section 15.249/15.215
Test Method:	ANSI C63.10: 2009
Receiver setup:	RBW=100kHz, VBW=300kHz, detector: Peak
Limit:	Operation Frequency range 2400MHz-2483.5MHz
Test Procedure:	<ol style="list-style-type: none"> 1. According to the follow Test-setup, keep the relative position between the artificial antenna and the EUT. 2. Set the EUT to proper test channel. 3. Max hold the radiated emissions, mark the peak power frequency point and the -20dB upper and lower frequency points. 4. Read 20dB bandwidth.
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected via a red cable to an E.U.T. (Equipment Under Test). Both are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.</p>
Test Instruments:	Refer to section 4.7 for details.
Test mode:	Transmitting mode
Test results:	Pass

Measurement Data

Test channel	20dB bandwidth (kHz)	Results
Lowest	264	Pass
Middle	266	Pass
Highest	294	Pass



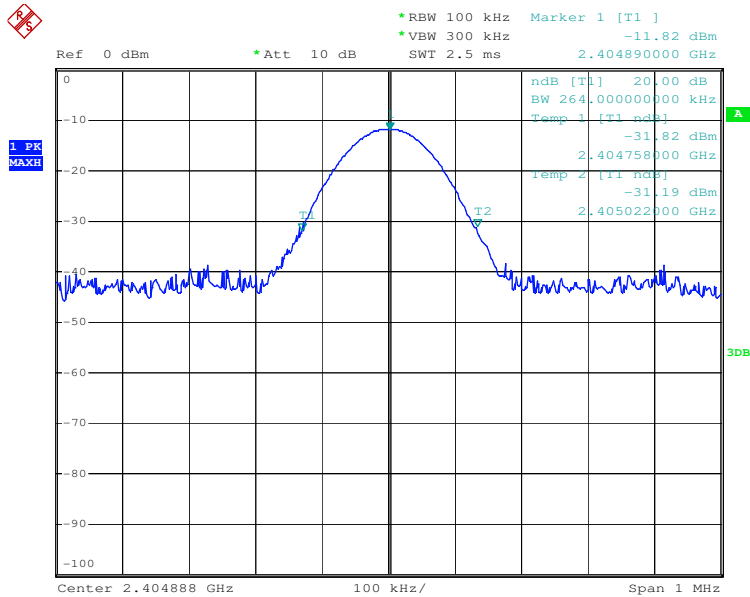
SGS-CSTC Standards Technical Services Ltd.

Report No.: SZEM110700255401

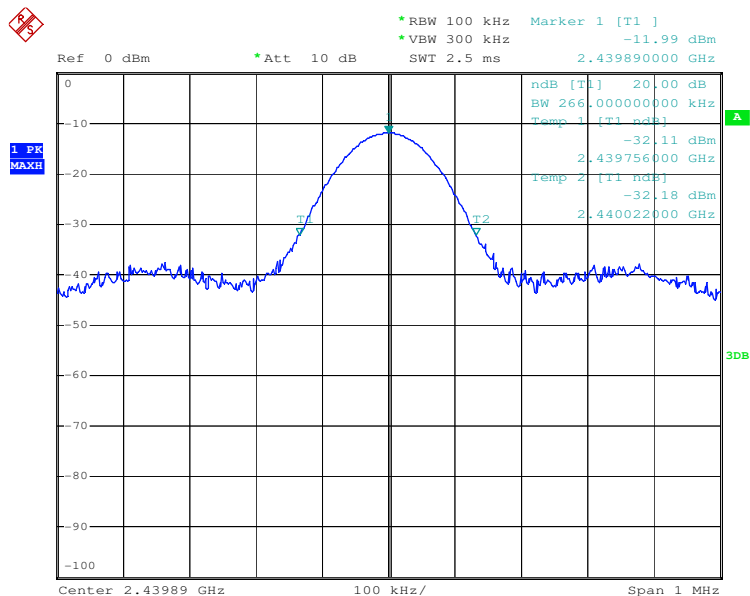
Page : 25 of 26

Test plot as follows:

Test channel:	Lowest	
---------------	--------	--



Test channel:	Middle	
---------------	--------	--



"This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at www.sgs.com/terms_and_conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at www.sgs.com/terms_e-document.htm. 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 90 days only."

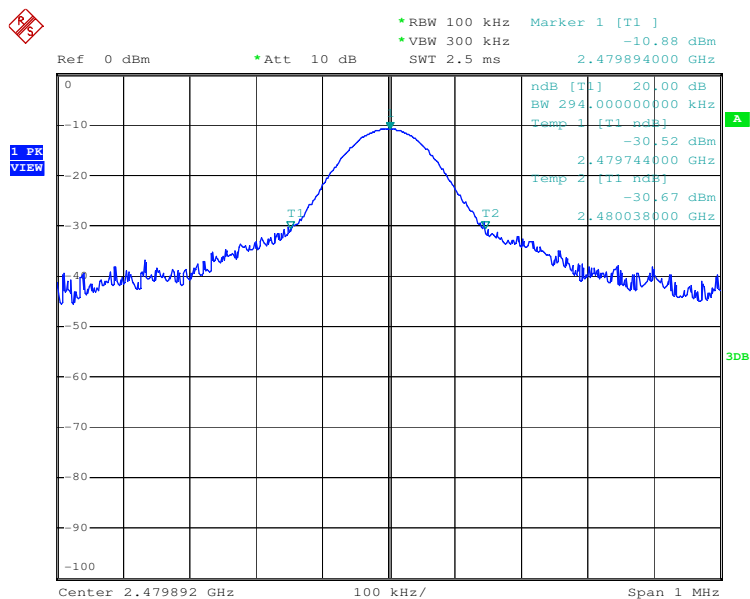


SGS-CSTC Standards Technical Services Ltd.

Report No.: SZEM110700255401

Page : 26 of 26

Test channel:	Highest	
---------------	---------	--



"This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at www.sgs.com/terms_and_conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at www.sgs.com/terms_e-document.htm. 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 90 days only."