FCC - TEST REPORT

Report Number	:	**68.950.20.0783.01**	Date of Issue:	2021-05-20
Model	:	**L1, L1xy ("x" and "y" can be replaced by A-Z, 0-9 or blank, which stands for marketing purpose)**		
Product Type	:	LED PROJECTOR		
Applicant	:	ASUSTeK COMPUTER INC.		
Address	:	1F., No.15, Lide Rd., 112 Beitou Dist., Taipei City, Taiwan.		
Manufacturer	:	ASUSTeK COMPUTER INC.		
Address	:	1F., No.15, Lide Rd., 112 Beitou Dist., Taipei City, Taiwan.		
Test Result	:	■ **Positive** ☐ **Negative**		
Total pages including Appendices	:	**63**		

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch is a subcontractor to TÜV SÜD Product Service GmbH according to the principles outlined in ISO 17025.

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch reports apply only to the specific samples tested under stated test conditions. Construction of the actual test samples has been documented. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. The manufacturer/importer is responsible to the Competent Authorities in Europe for any modifications made to the production units which result in non-compliance to the relevant regulations. TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch issued reports.

This report is the confidential property of the client. As a mutual protection to our clients, the public and ourselves, extracts from the test report shall not be reproduced except in full without our written approval

1 Table of Contents

1 Table of Contents 2
2 Details about the Test Laboratory 3
3 Description of the Equipment under Test 4
4 Summary of Test Standards 5
5 Summary of Test Results 6
6 General Remarks 7
7 Test Setups 8
8 Systems test configuration 9
9 Technical Requirement 10
9.1 Conducted Emission 10
9.2 Conducted output power & EIRP 13
9.3 6dB bandwidth 15
9.4 99% bandwidth 21
9.5 Power spectral density 27
9.6 Spurious RF conducted emissions 33
9.7 Band edge 47
9.8 Spurious radiated emissions for transmitter 51
10 Test Equipment List 62
11 System Measurement Uncertainty 63

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

2 Details about the Test Laboratory

Details about the Test Laboratory
Test Site 1

Company name:	TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District, Shenzhen City, 518052, P. R. China
FCC Designation Number:	CN5009
FCC Registration No.:	514049
Telephone:	86 755 8828 6998
Fax:	86 755 8828 5299

3 Description of the Equipment under Test

Product:	LED PROJECTOR
Model no.:	L1, L1xy ("x" and "y" can be replaced by A-Z, 0-9 or blank, which stands for marketing purpose)
FCC ID:	MSQ-L1
Rating:	7.2VDC, 3120mAh, (Supplied by Rechargeable Li-ion Battery) or 12VDC (Supplied by external adapter for Charging rechargeable battery) Adapter Model: ADP-36PH B Input: 100-240VAC 50-60Hz, 1A, Output: 12VDC,3A Manufacturer: DELTA ELECTRONICS, INC
RF Transmission Frequency:	2412MHz-2462MHz
No. of Operated Channel:	11
Modulation:	802.11b: BPSK, QPSK, CCK, 802.11g/802.11n HT20/40: BPSK, QPSK, 16-QAM, 64-QAM
Antenna Type:	Internal antenna
Antenna Ports	Ant 1
Antenna Gain:	2.6dBi Max for 2.4GHz 4.5dBi Max for 5GHz
Description of the EUT:	The equipment supports Bluetooth Low Energy/Bluetooth BR+EDR /WIFI functions. The TX and RX range is 2402MHz-2480MHz for Bluetooth, 2412MHz – 2462MHz for 2.4GHzWIFI, 5180MHz – 5320MHz, 5500MHz – 5700MHz, 5745MHz – 5825MHz for 5GHzWIFI

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

4 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C 10-1-2019 Edition	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators

All the test methods were according to KDB 558074 D01 15.247 Meas Guidance v05r02 and ANSI C63.10 (2013).

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

5 Summary of Test Results

Technical Requirements			
RSS-247 Issue 2/RSS-Gen Issue 5			
Test Condition		Test Result	Test Site
§15.207	Conducted emission AC power port	Pass	Site 1
§15.247 (b) (3)	Conducted output power	Pass	Site 1
§15.247(e)	Power spectral density	Pass	Site 1
§15.247(a)(2)	6dB bandwidth	Pass	Site 1
§15.247(a)(1)	20dB Occupied bandwidth	N/A	--
§15.247(a)(2)	99% Occupied Bandwidth	Pass	Site 1
§15.247(a)(1)	Carrier frequency separation	N/A	--
§15.247(a)(1)(iii)	Number of hopping frequencies	N/A	--
§15.247(a)(1)(iii)	Dwell Time	N/A	--
§15.247(d)	Spurious RF conducted emissions	Pass	Site 1
§15.247(d)	Band edge	Pass	Site 1
§15.247(d) & §15.209 & §15.205	Spurious radiated emissions for transmitter	Pass	Site 1
§15.203	Antenna requirement	Pass See note 2	--

Note 1: N/A=Not Applicable.
Note 2: The EUT uses an Internal antenna, which gain is 2.6dBi Max for 2.4GHz, 4.5dBi Max for 5GHz. In accordance to §15.203, it is considered sufficiently to comply with the provisions of this section.

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District, Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

6 General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID: MSQ-L1, complies with15.207, 15.209, 15.205, 15.247 of the FCC Part 15, Subpart C

L1, L1xy ("x" and "y" can be replaced by A-Z, 0-9 or blank, which stands for marketing purpose) is a LED PROJECTOR with Bluetooth Low Energy/Bluetooth BDR+EDR/WIFI function.
The difference among all Models is only model name.
Unless otherwise specified the model L1 was chosen as the representative model to perform full tests, and model: L1xy ("x" and "y" can be replaced by A-Z, 0-9 or blank, which stands for marketing purpose) was deemed to fulfil relevant RF requirements without further testing.

This report is for the WIFI 2.4GHz part.

SUMMARY:
All tests according to the regulations cited on page 6 were

■ - Performed

☐ - **Not** Performed

The Equipment under Test

■ - **Fulfills** the general approval requirements.

☐ - **Does not** fulfill the general approval requirements.

Sample Received Date:	2020-12-01
Testing Start Date:	2020-12-01
Testing End Date:	2020-12-25

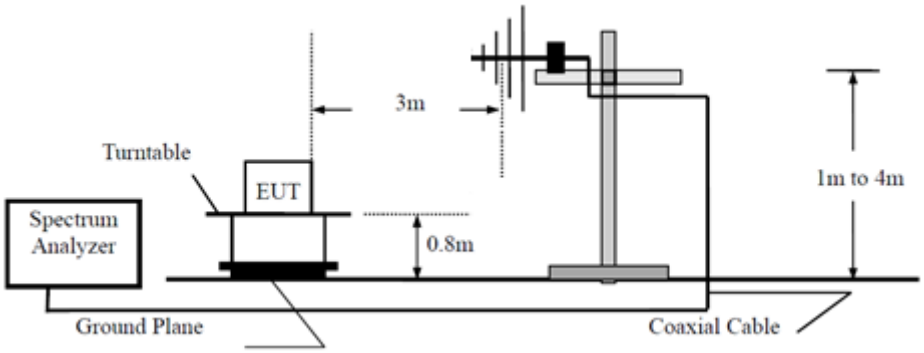
- TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch -

Reviewed by:	Prepared by:	Tested by:
John Zhi	Joe Gu	Carry Cai
Project Manager	Project Engineer	Test Engineer

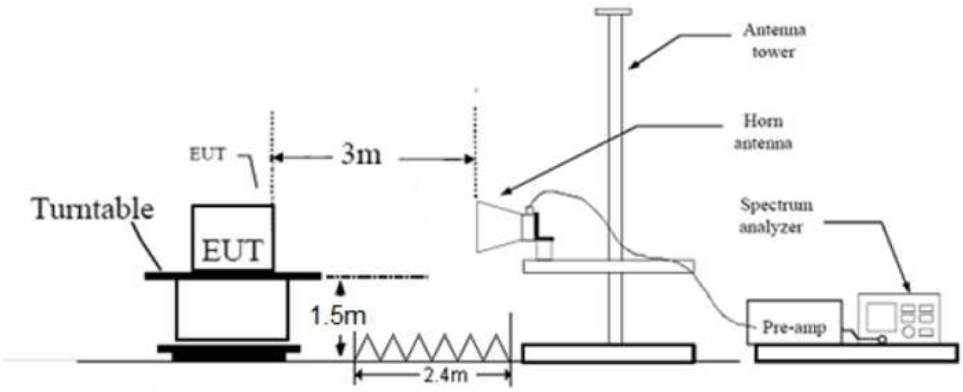
7 Test Setups

7.1 Radiated test setups

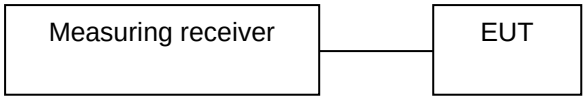
Below 1GHz



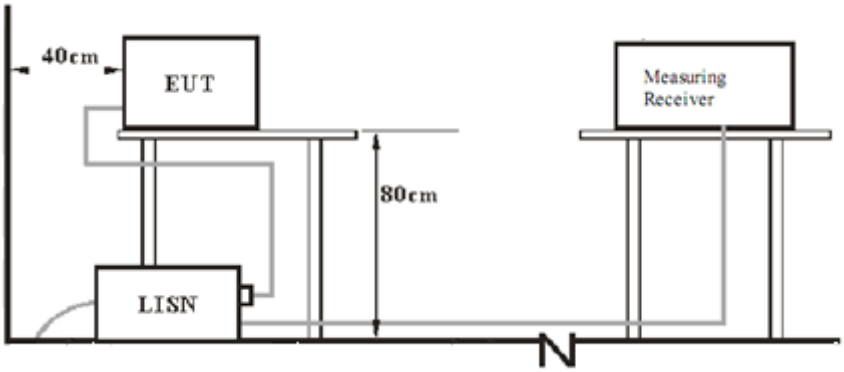
Above 1GHz



7.2 Conducted RF test setups



7.3 AC Power Line Conducted Emission test setups



TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

8 Systems test configuration

Auxiliary Equipment Used during Test:

Description	Manufacturer	Model no.	Serial no.	CAL. DUe DATE
Laptop	Thinkpad	X220	---	---

Test Channel information:

Test Mode	**Channel (MHz)**		
802.11b	CH 1: 2412MHz	CH 6: 2437MHz	CH 11: 2462MHz
802.11g	CH 1: 2412MHz	CH 6: 2437MHz	CH 11: 2462MHz
802.11n HT20	CH 1: 2412MHz	CH 6: 2437MHz	CH 11: 2462MHz
802.11n HT40	CH 3: 2422MHz	CH 6: 2437MHz	CH 9: 2452MHz

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

9 Technical Requirement

9.1 Conducted Emission

Test Method

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. Both sides of AC line were checked for maximum conducted interference.
6. The frequency range from 150 kHz to 30 MHz was searched.
7. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively

Limit According to §15.207, conducted emissions limit as below:

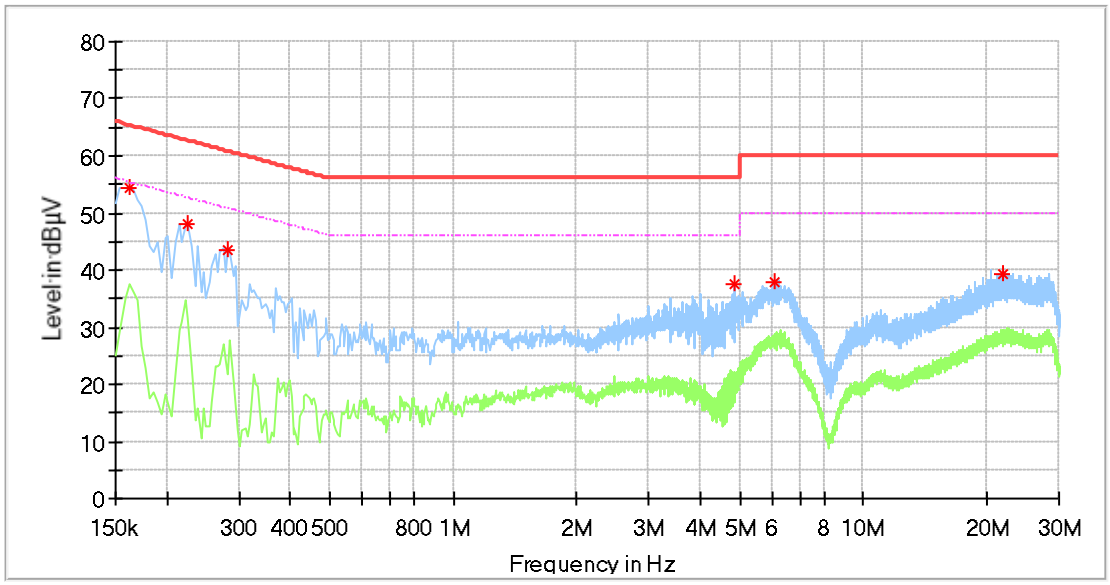
Frequency MHz	QP Limit dBµV	AV Limit dBµV
0.150-0.500	66-56*	56-46*
0.500-5	56	46
5-30	60	50

*Decreasing linearly with logarithm of the frequency

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

Conducted Emission

Product Type : LED PROJECTOR
M/N : L1
Operating Condition : Charging + Transmit
Test Specification : Power Line, Live
Comment : AC 120V/60Hz (External adapter)



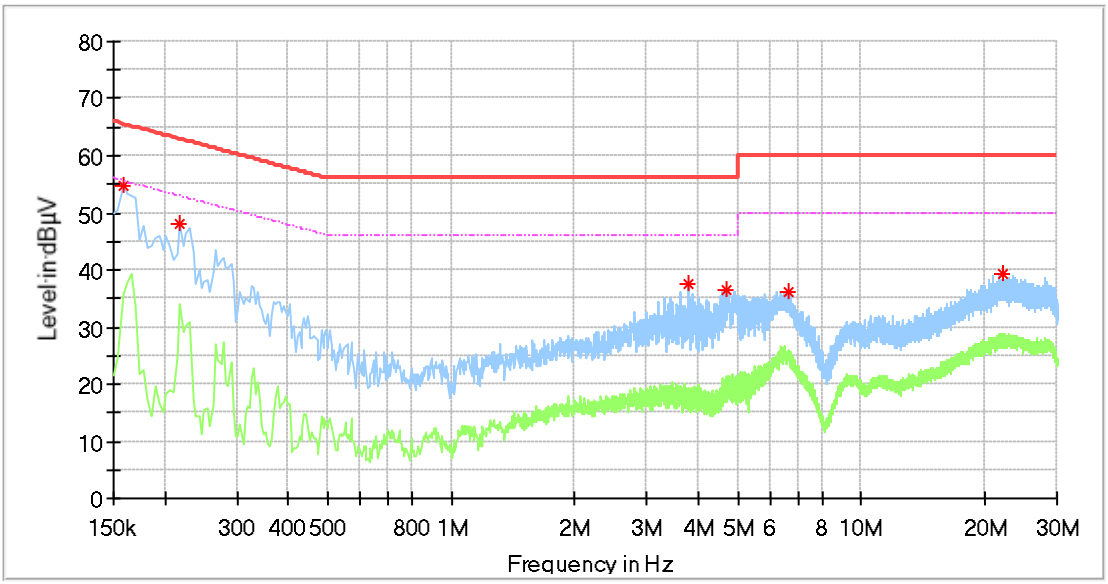
Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.162000	54.44	---	65.36	10.92	L1	10.32
0.226000	48.16	---	62.60	14.43	L1	10.32
0.282000	43.62	---	60.76	17.13	L1	10.32
4.858000	37.56	---	56.00	18.44	L1	10.51
6.106000	37.91	---	60.00	22.09	L1	10.57
21.826000	39.46	---	60.00	20.54	L1	11.35

Remark：
Level=Reading Level + Correction Factor
Correction Factor=Cable Loss + LISN Factor
(The Reading Level is recorded by software which is not shown in the sheet)

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

Conducted Emission

Product Type : LED PROJECTOR
M/N : L1
Operating Condition : Charging + Transmit
Test Specification : Power Line, Neutral
Comment : AC 120V/60Hz (External adapter)



Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.158000	54.88	---	65.57	10.69	N	10.33
0.218000	47.91	---	62.89	14.98	N	10.33
3.794000	37.46	---	56.00	18.54	N	10.48
4.690000	36.48	---	56.00	19.52	N	10.53
6.638000	36.31	---	60.00	23.69	N	10.64
22.098000	39.26	---	60.00	20.74	N	11.53

Remark：
Level=Reading Level + Correction Factor
Correction Factor=Cable Loss + LISN Factor
(The Reading Level is recorded by software which is not shown in the sheet)

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

9.2 Conducted output power

Test Method

1. The EUT was placed on 0.8m height table, the RF output of EUT was connected to the power meter by RF cable. The path loss was compensated to the results for each measurement.
2. Setting the highest output power level of the EUT
3. Record the power value.

Limits

According to §15.247 (b) (3), conducted output power limit as below:

Frequency Range MHz	Limit W	Limit dBm
2400-2483.5	≤1	≤30

Test result as below table

802.11b_SISO modulation Test Result

Frequency (MHz)	Conducted Output Power (dBm)	Result
Low channel 2412MHz	14.9	Pass
Middle channel 2437MHz	15.2	Pass
High channel 2462MHz	14.4	Pass

802.11g_SISO modulation Test Result

Frequency (MHz)	Conducted Output Power (dBm)	Result
Low channel 2412MHz	14.2	Pass
Middle channel 2437MHz	14.4	Pass
High channel 2462MHz	13.5	Pass

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

802.11n20_SISO modulation Test Result

Frequency (MHz)	Conducted Output Power (dBm)	Result
Low channel 2412MHz	13.3	Pass
Middle channel 2437MHz	13.3	Pass
High channel 2462MHz	12.9	Pass

802.11n40_SISO modulation Test Result

Frequency (MHz)	Conducted Output Power (dBm)	Result
Low channel 2422MHz	13.5	Pass
Middle channel 2437MHz	13.0	Pass
High channel 2452MHz	13.0	Pass

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

9.3 6dB bandwidth

Test Method

1. Connect EUT test port to spectrum analyzer.
2. Use the following spectrum analyzer settings:
   RBW=100K, VBW≥3RBW, Sweep = auto, Detector function = peak, Trace = max hold
3. Use the automatic bandwidth measurement capability of an instrument, may be employed using the X dB bandwidth mode with X set to 6 dB, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥ 6 dB.
4. Allow the trace to stabilize, record the X dB Bandwidth value.

Limit

Limit [kHz]
≥500

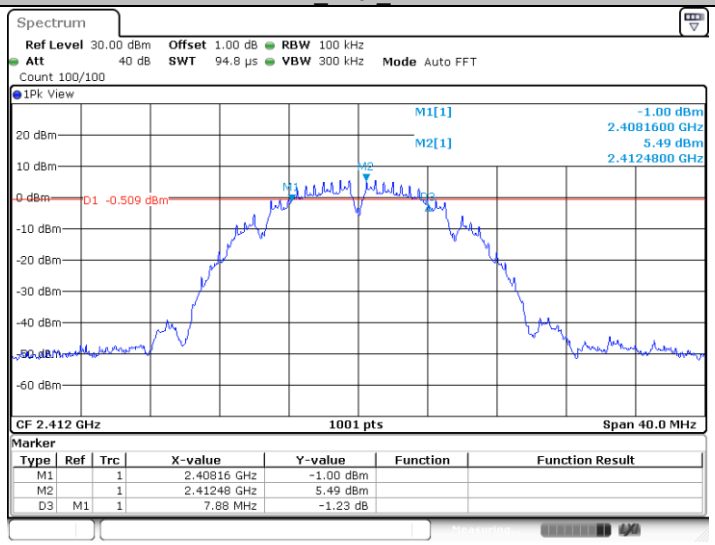
Test result

TestMode	Channel[MHz]	DTS BW [MHz]	Limit [MHz]	Verdict
11B	2412	7.880	0.5	PASS
	2437	7.200	0.5	PASS
	2462	8.240	0.5	PASS
11G	2412	16.440	0.5	PASS
	2437	16.440	0.5	PASS
	2462	16.440	0.5	PASS
11N20SISO	2412	17.640	0.5	PASS
	2437	17.640	0.5	PASS
	2462	17.680	0.5	PASS
11N40SISO	2422	35.280	0.5	PASS
	2437	35.200	0.5	PASS
	2452	35.680	0.5	PASS

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

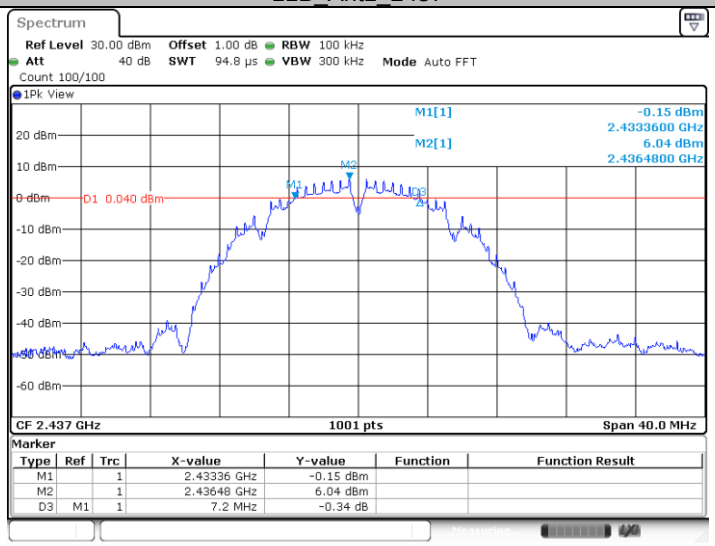
Test Graphs

11B_Ant1_2412



Date: 4.DEC.2020 09:49:24

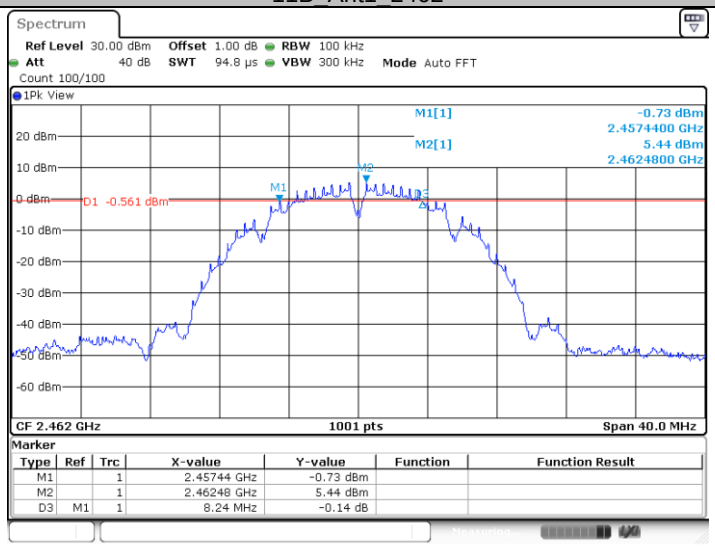
11B_Ant1_2437



Date: 4.DEC.2020 09:52:39

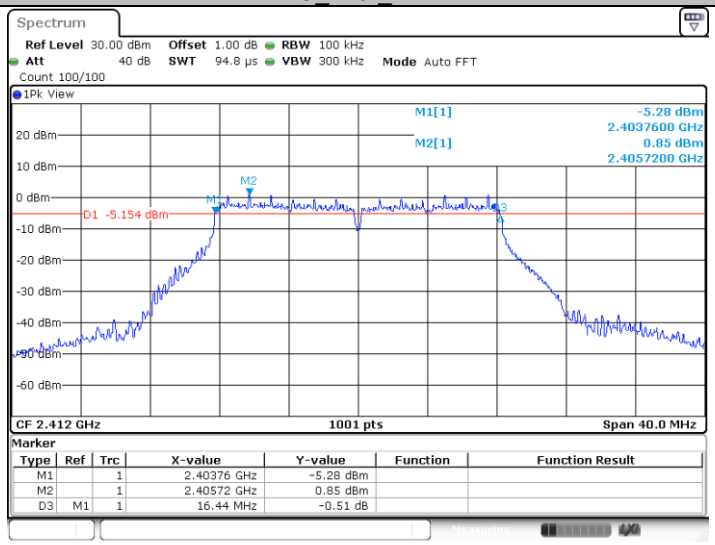
TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

11B_Ant1_2462



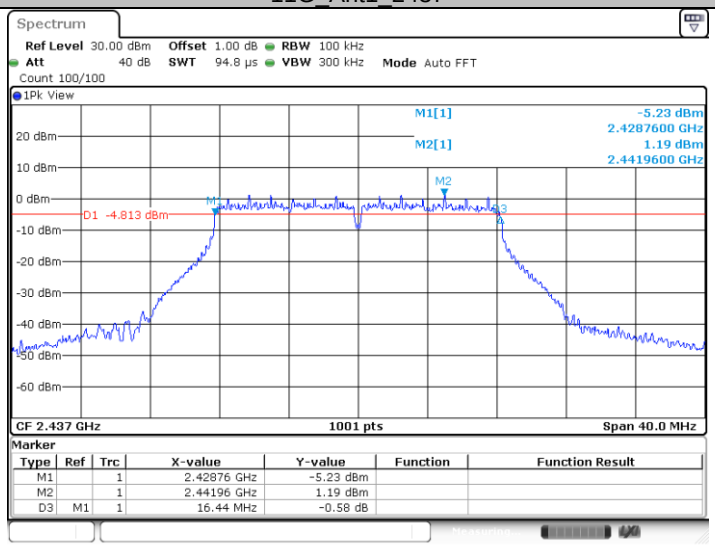
Date: 4.DEC.2020 09:55:56

11G_Ant1_2412



Date: 4.DEC.2020 09:58:21

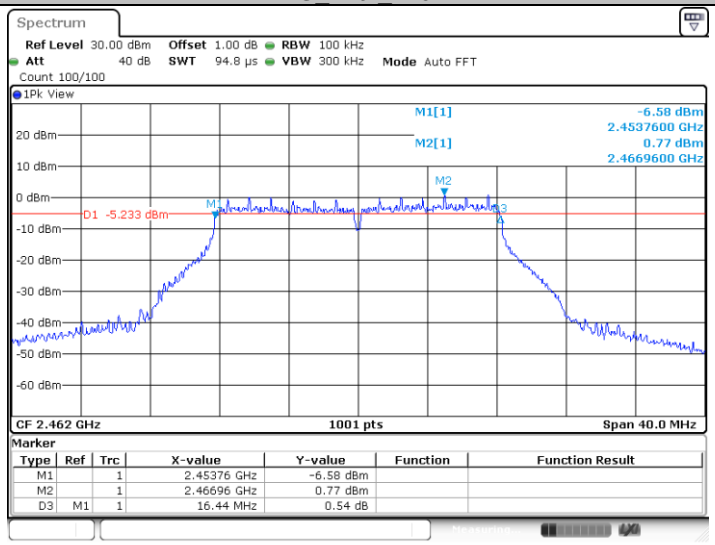
11G_Ant1_2437



Date: 4.DEC.2020 10:00:41

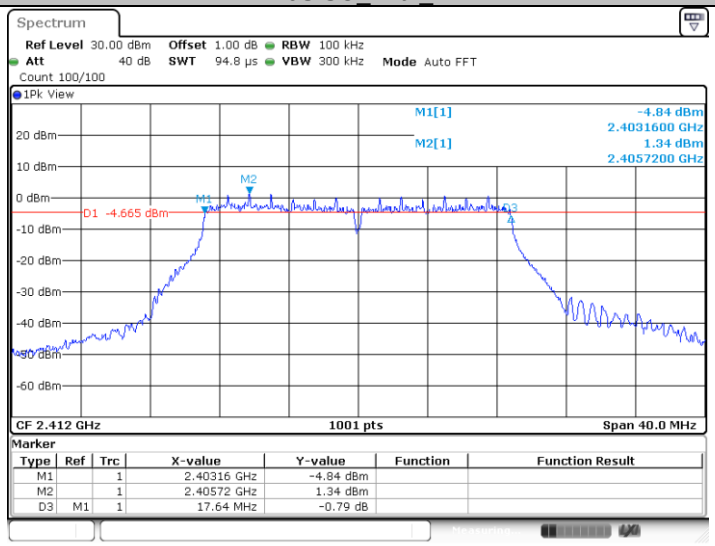
TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

11G_Ant1_2462



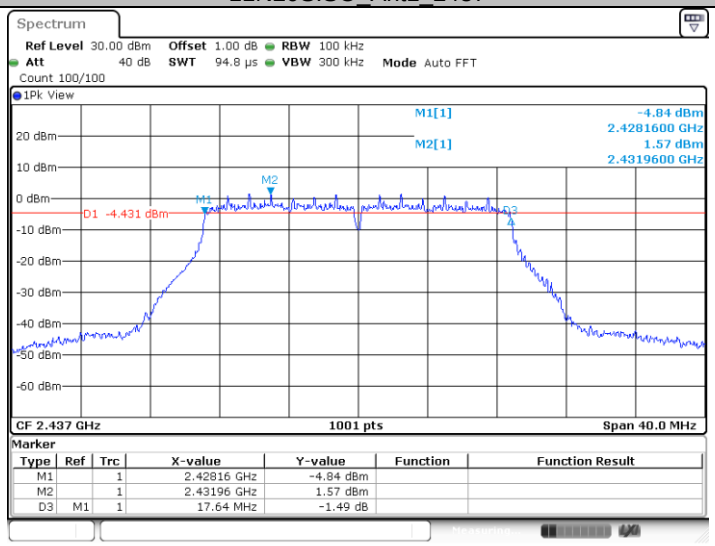
Date: 4.DEC.2020 10:03:10

11N20SISO_Ant1_2412



Date: 4.DEC.2020 10:05:41

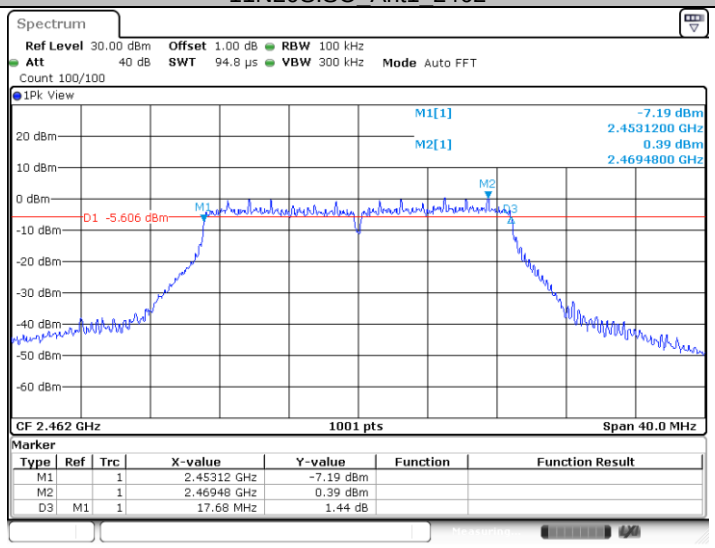
11N20SISO_Ant1_2437



Date: 4.DEC.2020 10:08:00

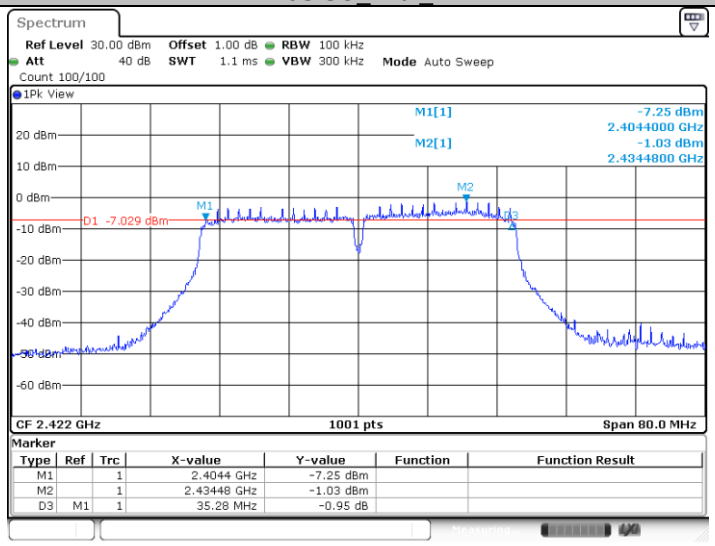
TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

11N20SISO_Ant1_2462



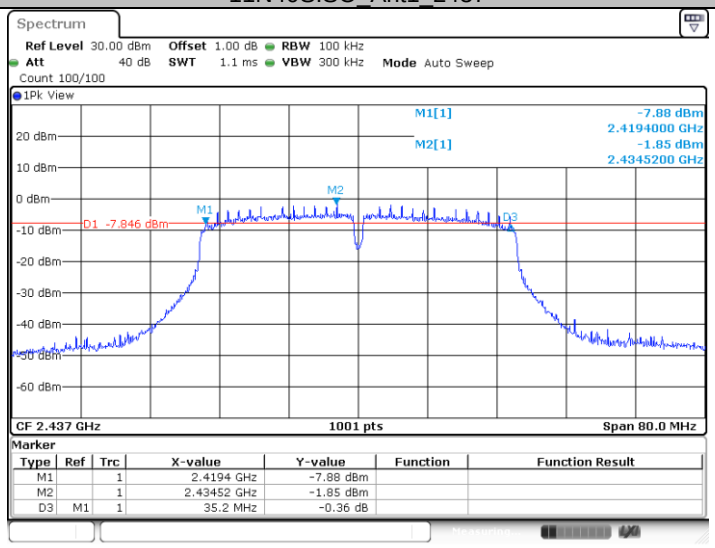
Date: 4.DEC.2020 10:10:03

11N40SISO_Ant1_2422



Date: 4.DEC.2020 10:18:52

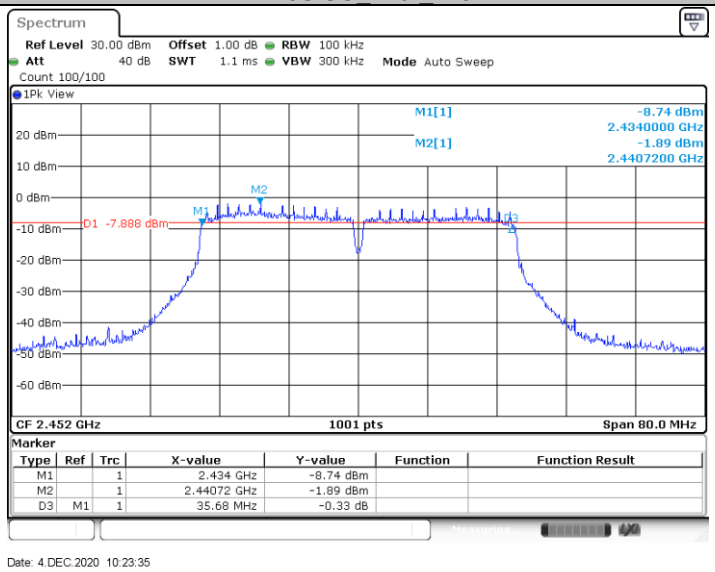
11N40SISO_Ant1_2437



Date: 4.DEC.2020 10:20:45

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

11N40SISO_Ant1_2452



9.4 99% bandwidth

Test Method

1. Connect EUT test port to spectrum analyzer.
2. Use the following spectrum analyzer settings:
RBW=1% to 5% of the actual occupied, VBW≥3RBW, Sweep = auto,
Detector function = peak, Trace = max hold
3. Use the automatic bandwidth measurement capability of an instrument, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥ 6 dB.
4. Allow the trace to stabilize, record the X dB Bandwidth value.

Limit

Limit [kHz]
--

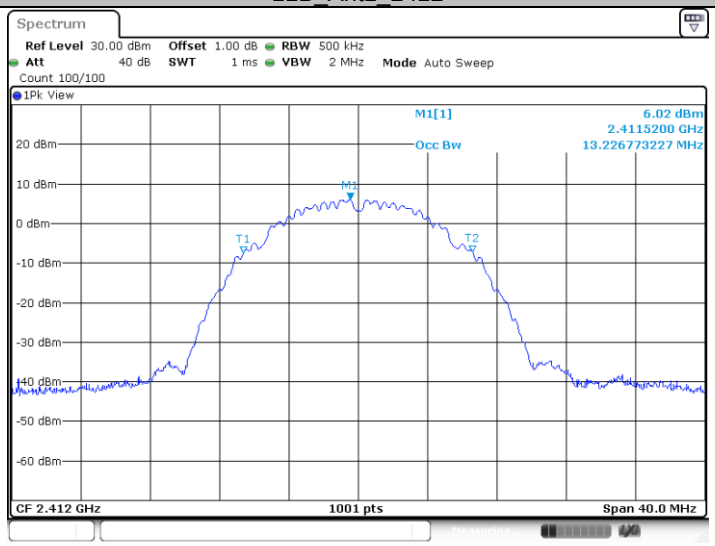
Test Result

TestMode	Channel[MHz]	OCB [MHz]	Limit[MHz]	Verdict
11B	2412	13.227	---	PASS
	2437	12.987	---	PASS
	2462	13.267	---	PASS
11G	2412	17.982	---	PASS
	2437	17.662	---	PASS
	2462	18.022	---	PASS
11N20SISO	2412	18.741	---	PASS
	2437	18.541	---	PASS
	2462	18.781	---	PASS
11N40SISO	2422	36.923	---	PASS
	2437	36.444	---	PASS
	2452	37.243	---	PASS

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

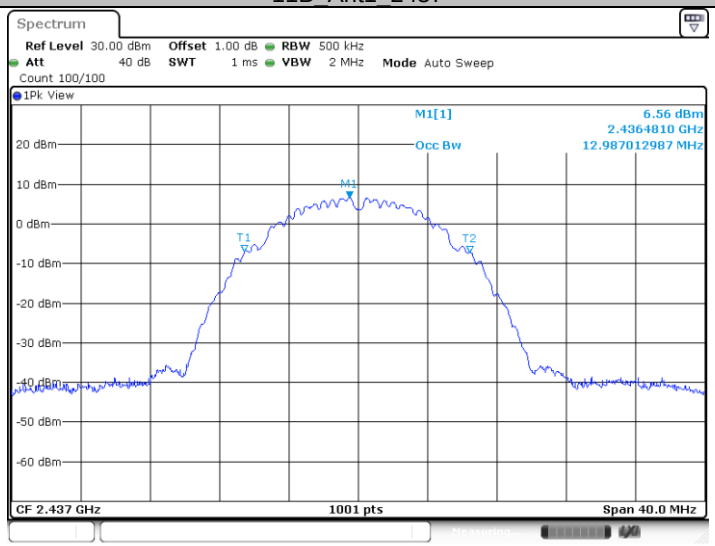
Test Graphs

11B_Ant1_2412



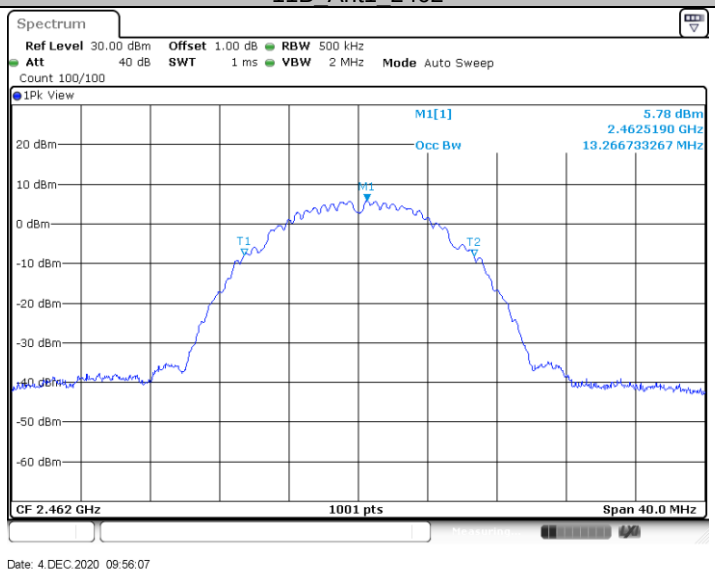
Date: 4.DEC.2020 09:49:35

11B_Ant1_2437

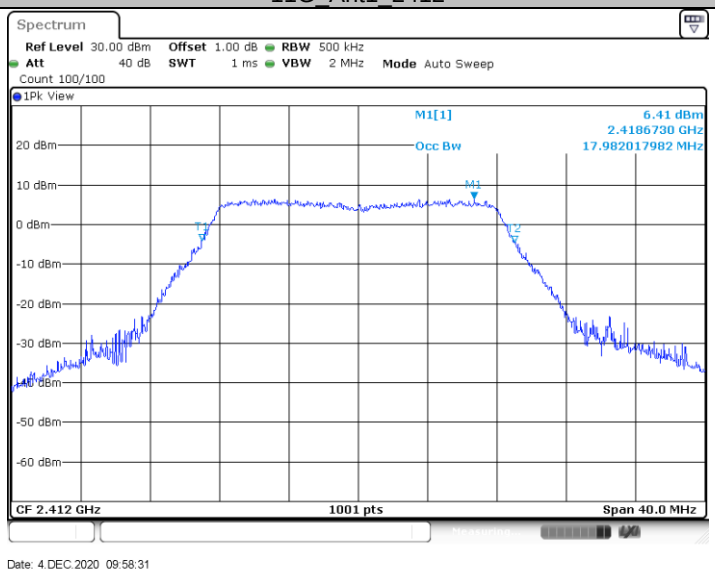


Date: 4.DEC.2020 09:52:50

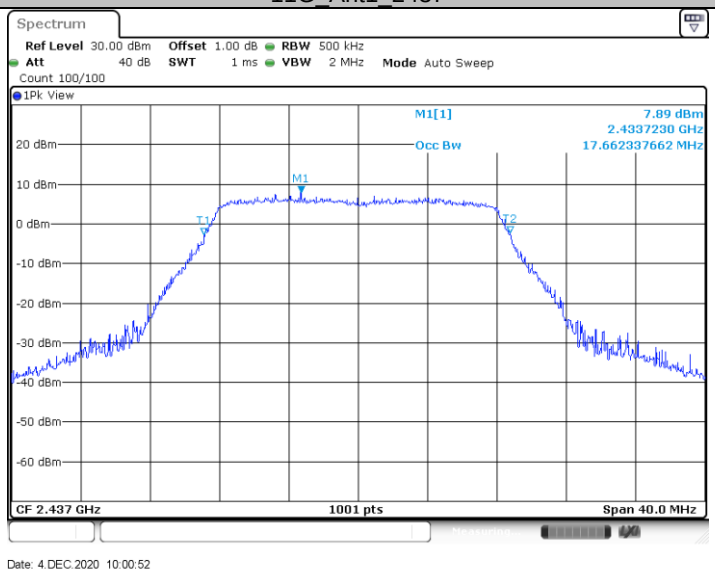
11B_Ant1_2462



11G_Ant1_2412

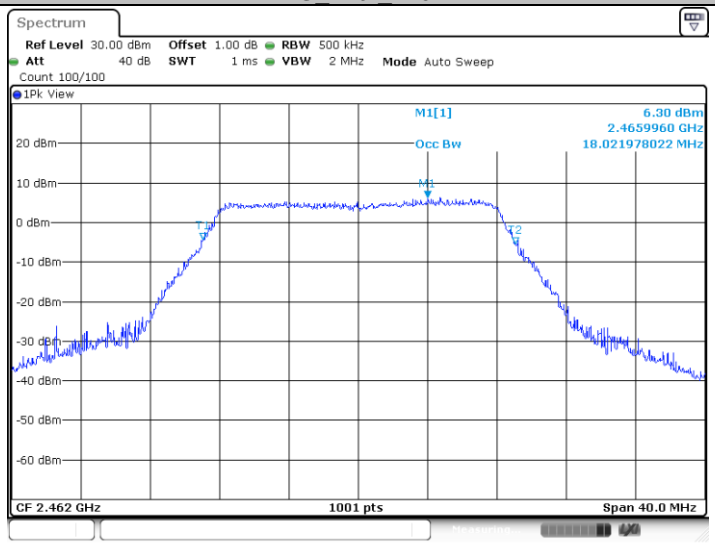


11G_Ant1_2437



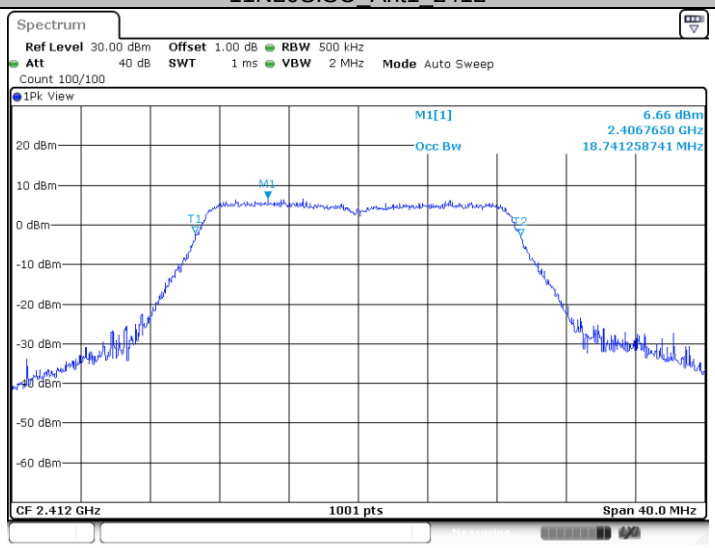
TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

11G_Ant1_2462



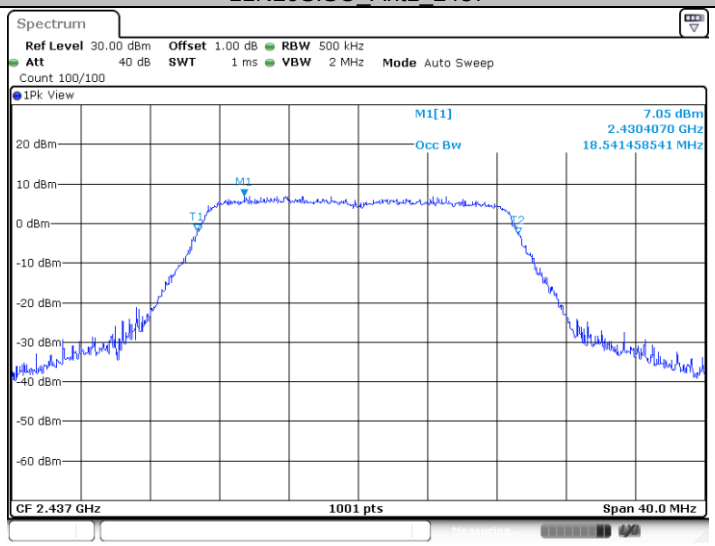
Date: 4.DEC.2020 10:03:21

11N20SISO_Ant1_2412



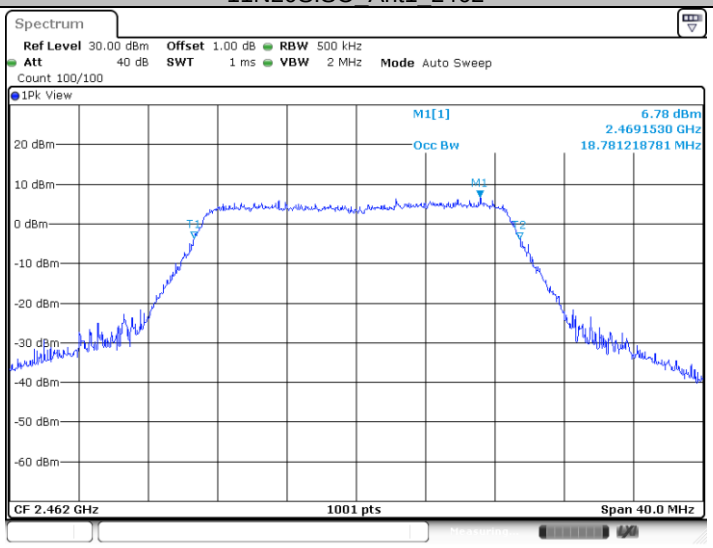
Date: 4.DEC.2020 10:05:52

11N20SISO_Ant1_2437



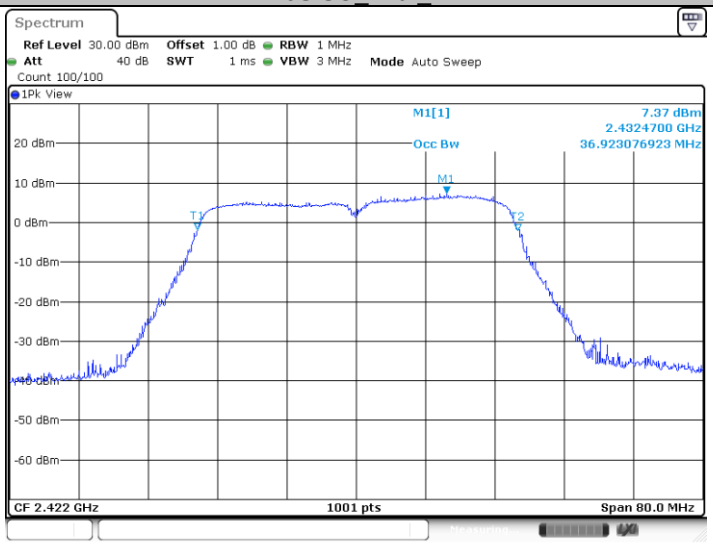
Date: 4.DEC.2020 10:08:11

11N20SISO_Ant1_2462



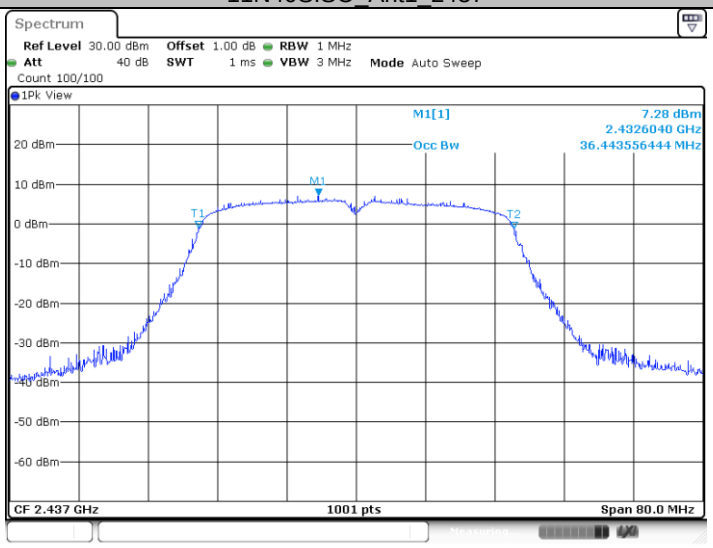
Date: 4.DEC.2020 10:10:14

11N40SISO_Ant1_2422



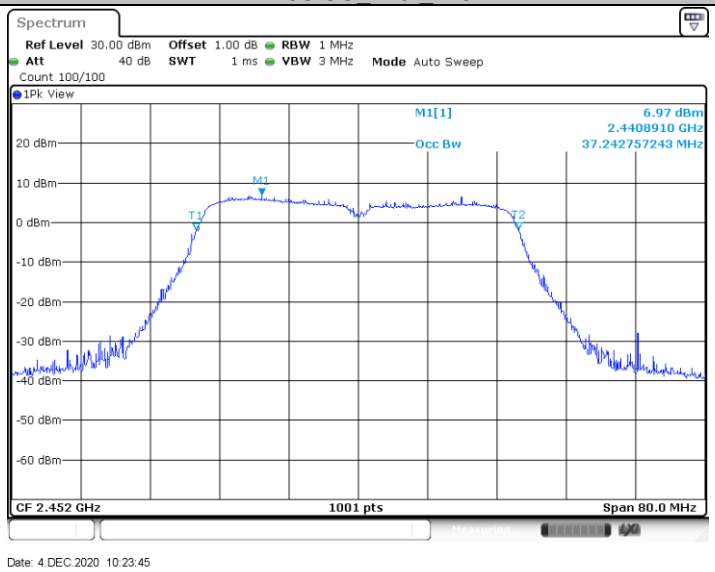
Date: 4.DEC.2020 10:19:03

11N40SISO_Ant1_2437



Date: 4.DEC.2020 10:20:56

11N40SISO_Ant1_2452



TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

9.5 Power spectral density

Test Method

This procedure shall be used if maximum peak conducted output power was used to demonstrate compliance:

1. The RF output of EUT was connected to the test receiver by RF cable. The path loss was compensated to the results for each measurement.
2. Set analyzer center frequency to DTS channel center frequency. RBW=3kHz, VBW≥3RBW, Span=1.5 times DTS bandwidth, Detector=Peak, Sweep=auto, Trace= max hold.
3. Allow trace to fully stabilize, use the peak marker function to determine the maximum amplitude level within the RBW.
4. Repeat above procedures until other frequencies measured were completed.

Limit

Limit [dBm/3KHz]
≤8

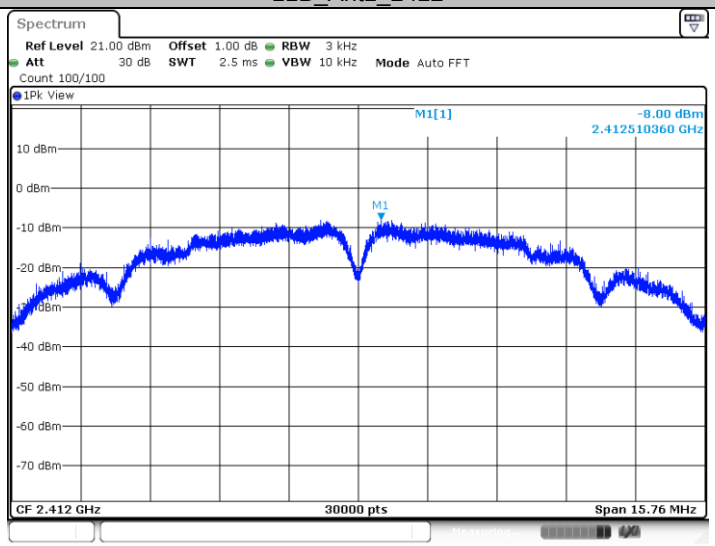
Test result

TestMode	Channel[MHz]	Result(dBm/3KHz)	Limit(dBm/3KHz)	Verdict
11B	2412	-8	<=8	PASS
	2437	-7.27	<=8	PASS
	2462	-8.19	<=8	PASS
11G	2412	-12.18	<=8	PASS
	2437	-11.91	<=8	PASS
	2462	-12.61	<=8	PASS
11N20SISO	2412	-12.41	<=8	PASS
	2437	-12.03	<=8	PASS
	2462	-12.88	<=8	PASS
11N40SISO	2422	-15.09	<=8	PASS
	2437	-16.03	<=8	PASS
	2452	-15.91	<=8	PASS

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

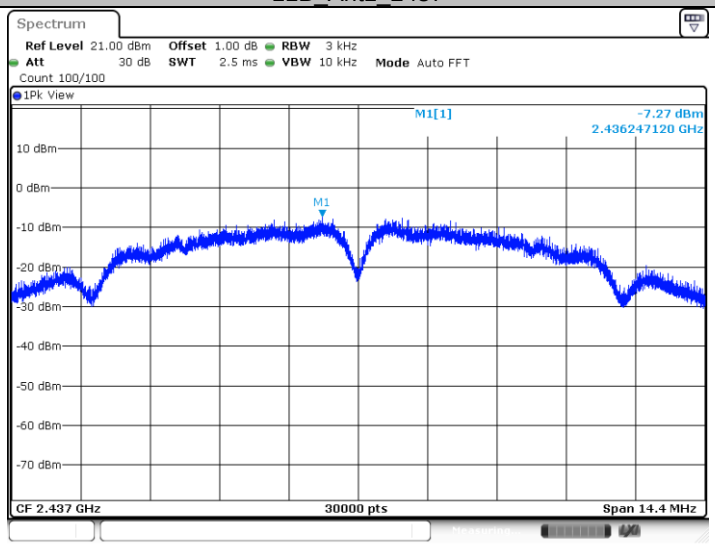
Test Graphs

11B_Ant1_2412



Date: 4.DEC.2020 09:49:47

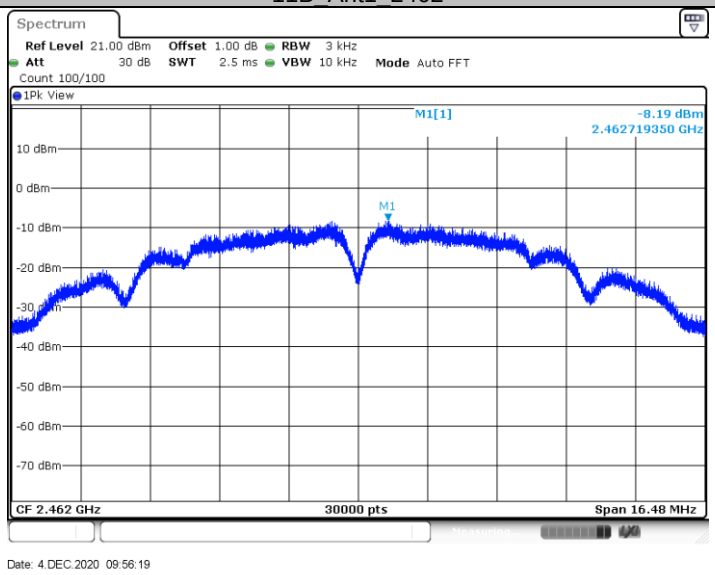
11B_Ant1_2437



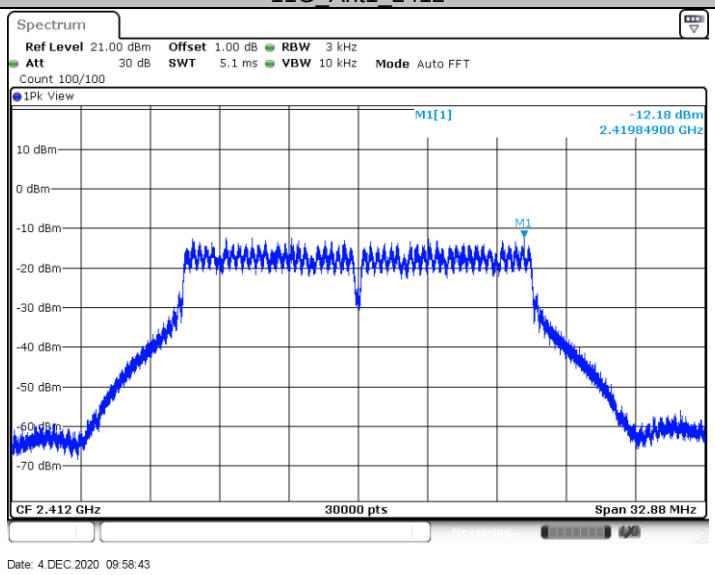
Date: 4.DEC.2020 09:53:02

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

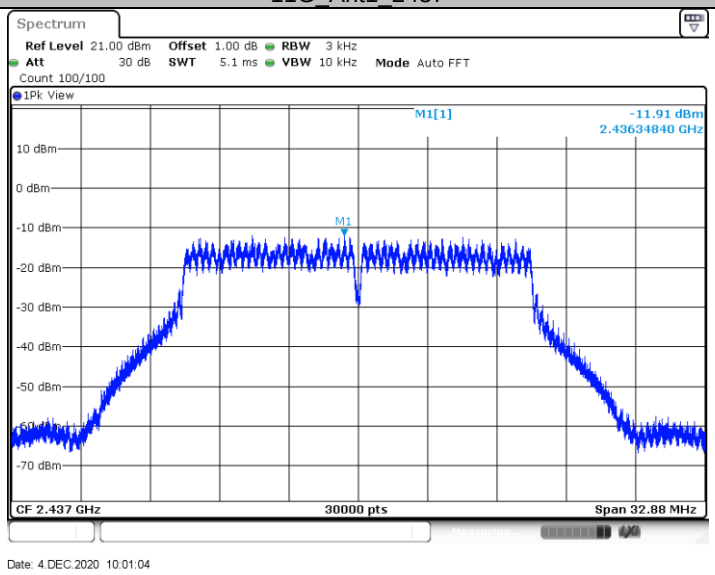
11B_Ant1_2462



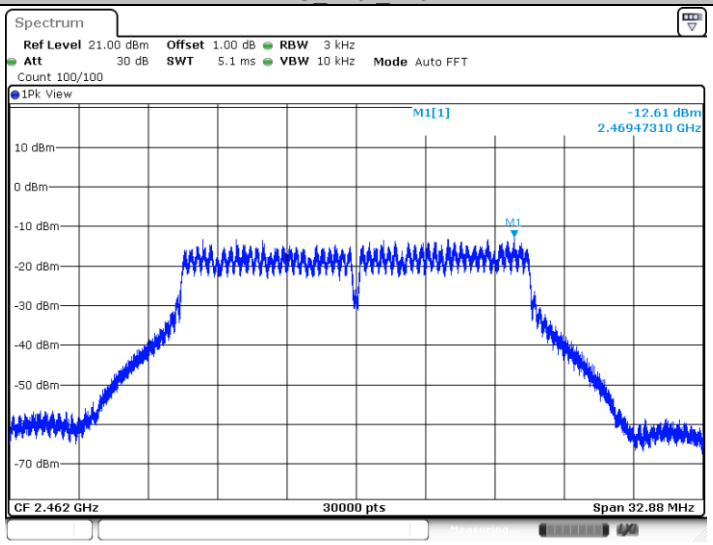
11G_Ant1_2412



11G_Ant1_2437

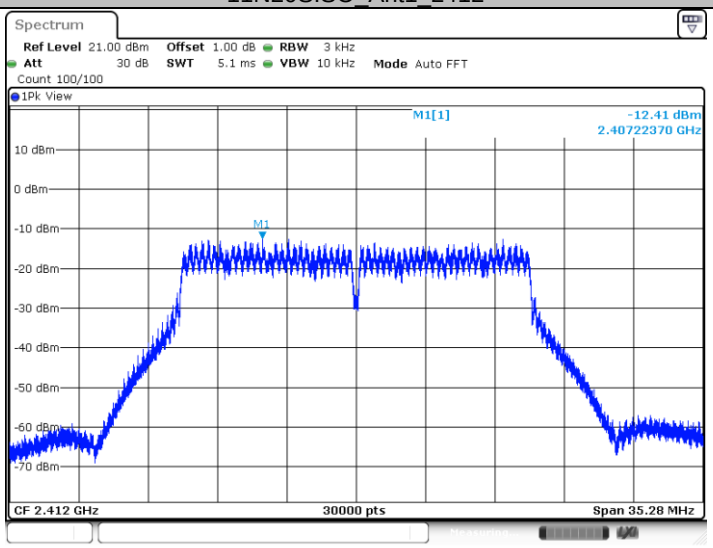


11G_Ant1_2462



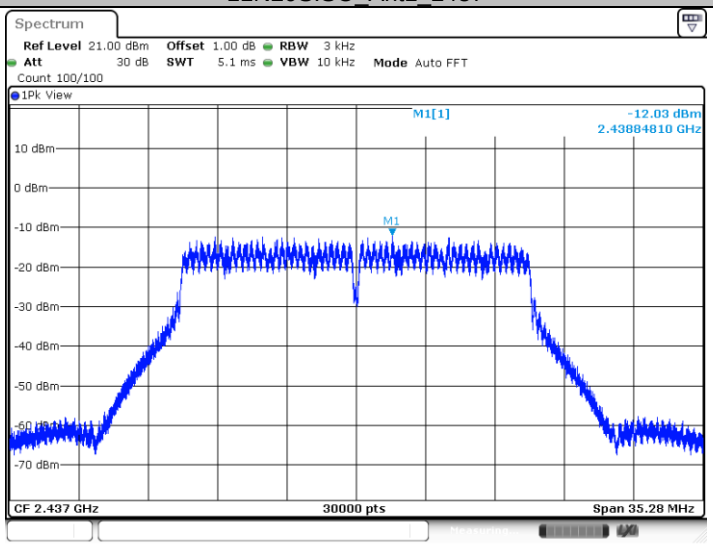
Date: 4.DEC.2020 10:03:32

11N20SISO_Ant1_2412



Date: 4.DEC.2020 10:06:04

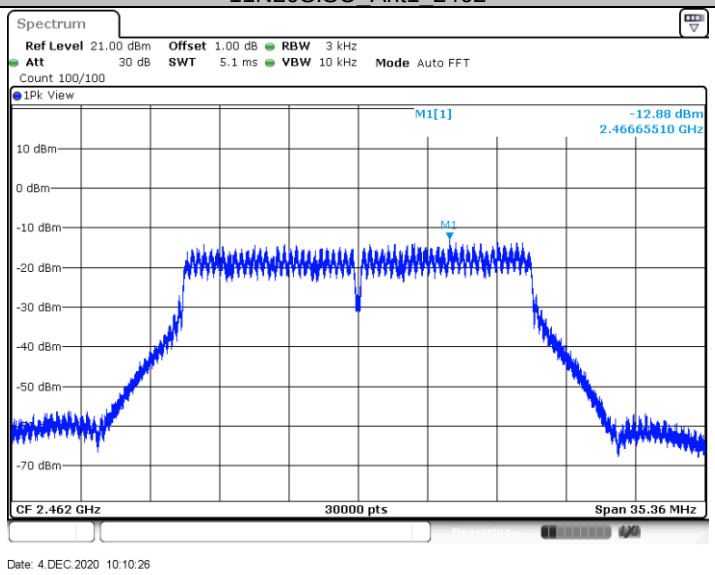
11N20SISO_Ant1_2437



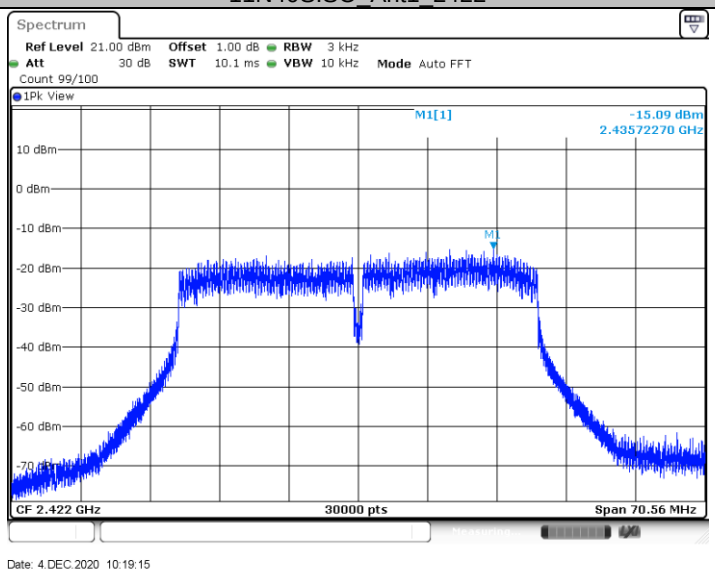
Date: 4.DEC.2020 10:08:23

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

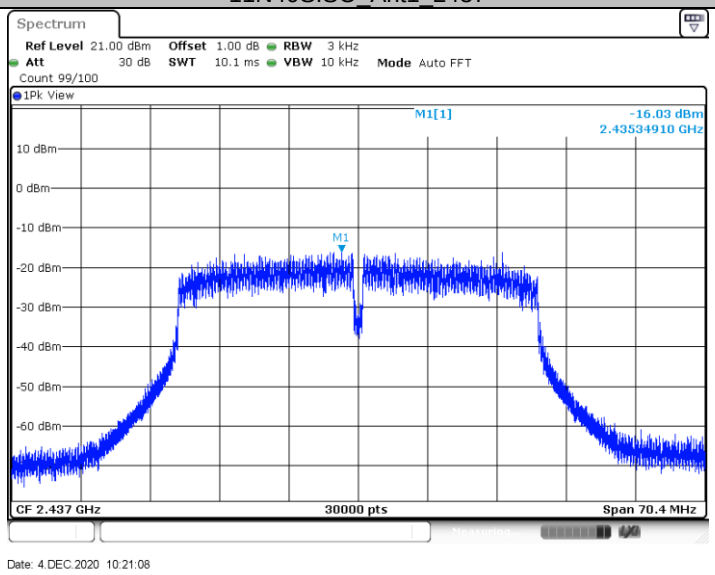
11N20SISO_Ant1_2462



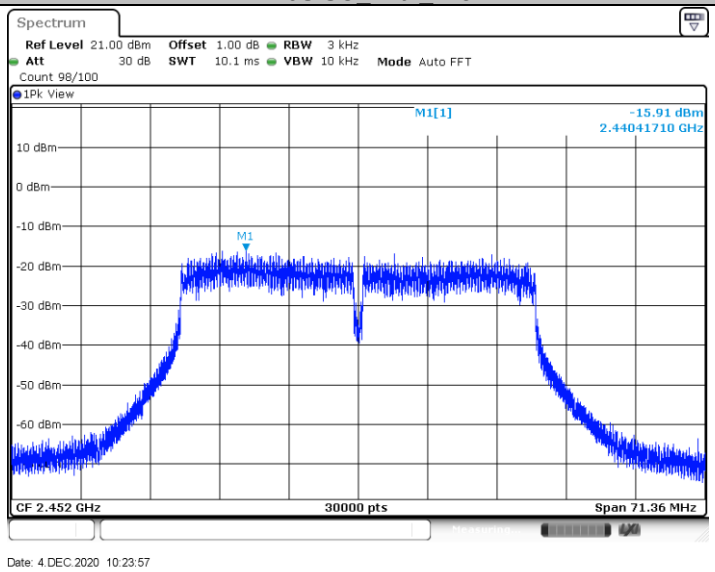
11N40SISO_Ant1_2422



11N40SISO_Ant1_2437



TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

11N40SISO_Ant1_2452


TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

9.6 Spurious RF conducted emissions

Test Method

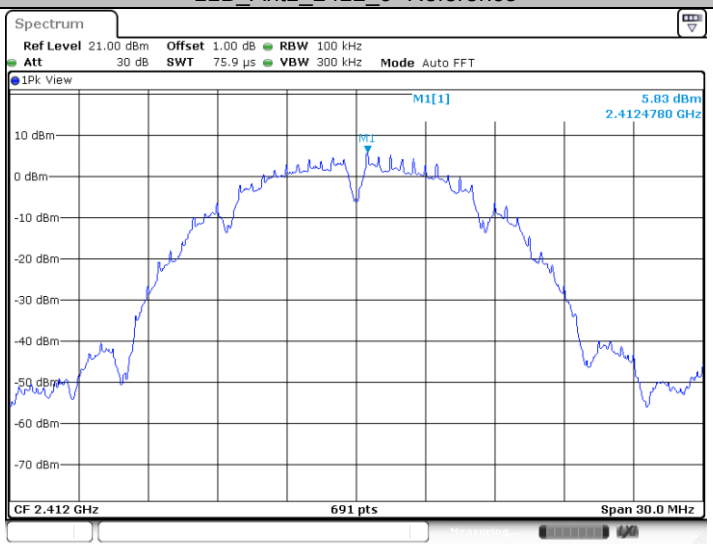
1. The RF output of EUT was connected to the spectrum analyzer by RF cable. The path loss was compensated to the results for each measurement.
2. Use the following spectrum analyzer settings:
   Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span.
   RBW = 100 kHz, VBW≥RBW, Sweep = auto, Detector function = peak, Trace = max hold
3. Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded.
4. The level displayed must comply with the limit specified in this Section. Submit these plots.
5. Repeat above procedures until all frequencies measured were complete.

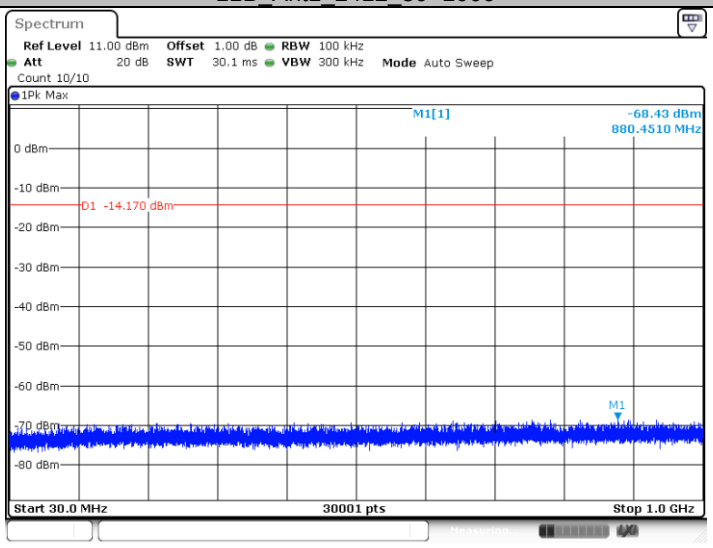
Limit

Frequency Range MHz	Limit (dBc)
30-25000	-20

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

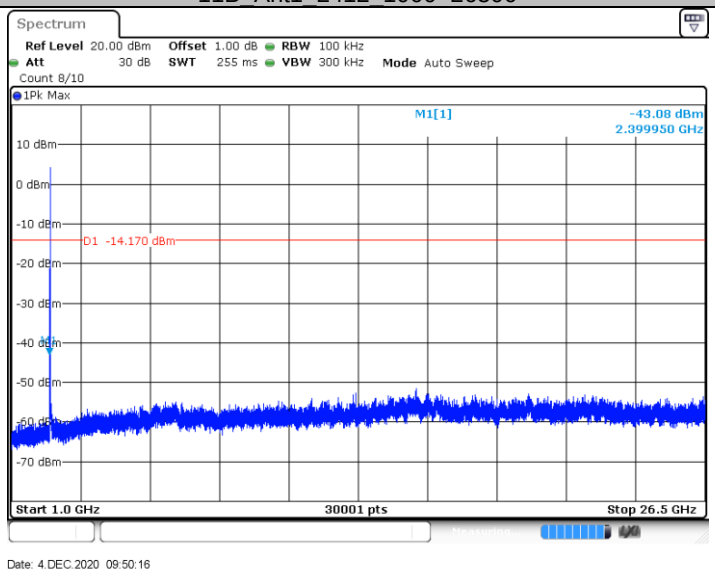
Test Result

11B_Ant1_2412_0~Reference


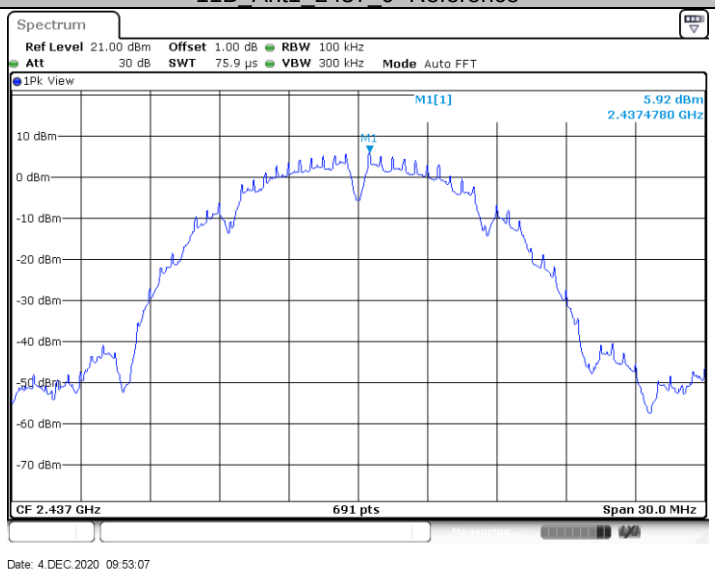
11B_Ant1_2412_30~1000


TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

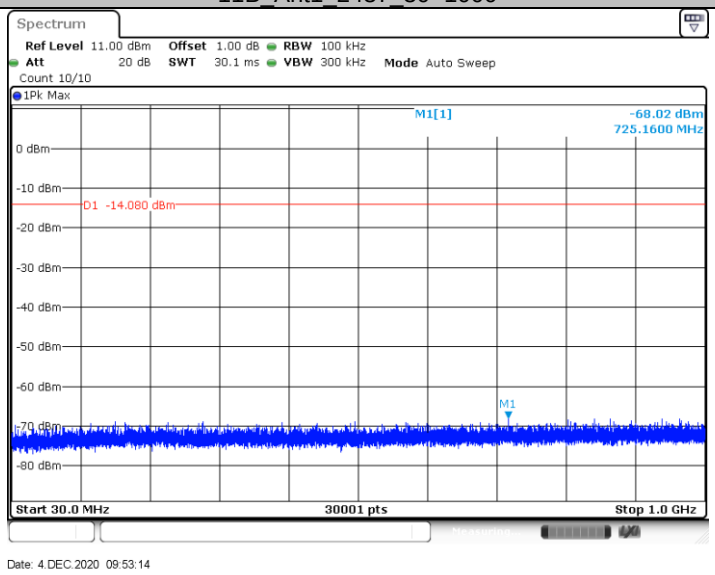
11B_Ant1_2412_1000~26500



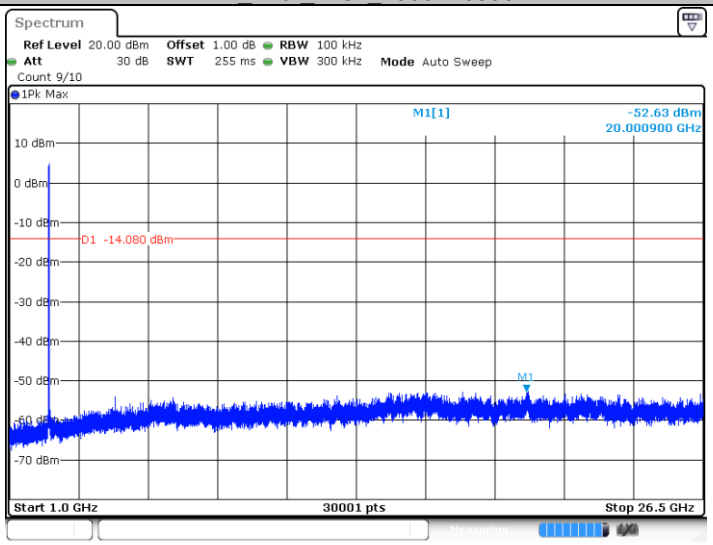
11B_Ant1_2437_0~Reference



11B_Ant1_2437_30~1000

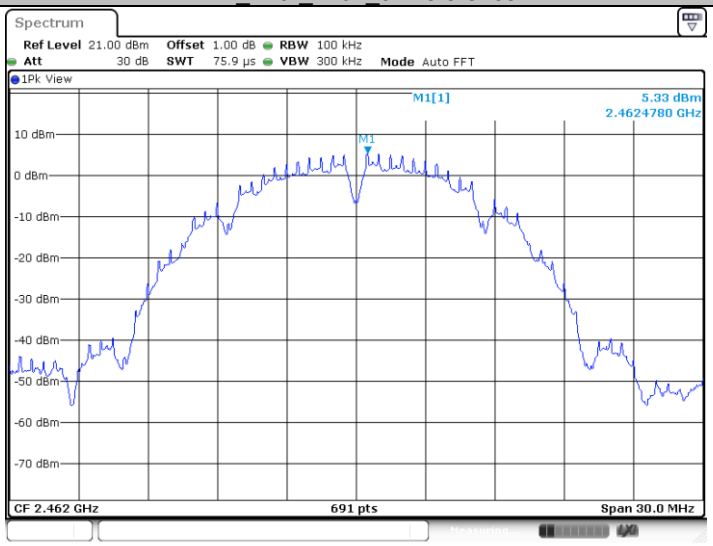


11B_Ant1_2437_1000~26500



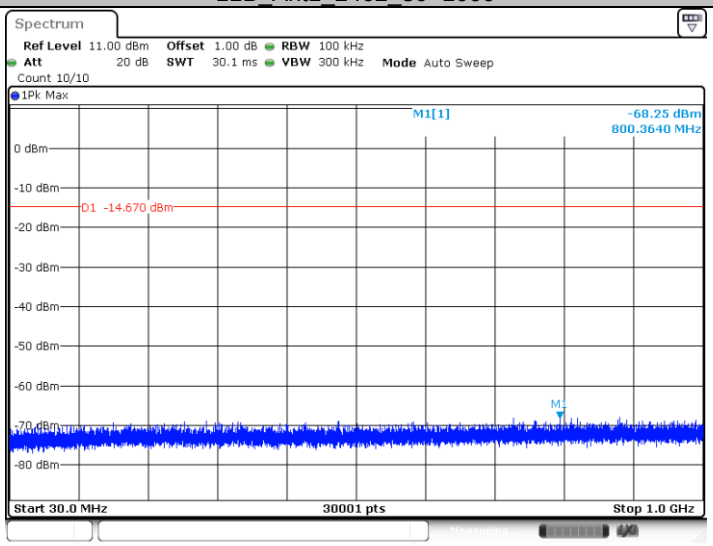
Date: 4.DEC.2020 09:53:21

11B_Ant1_2462_0~Reference



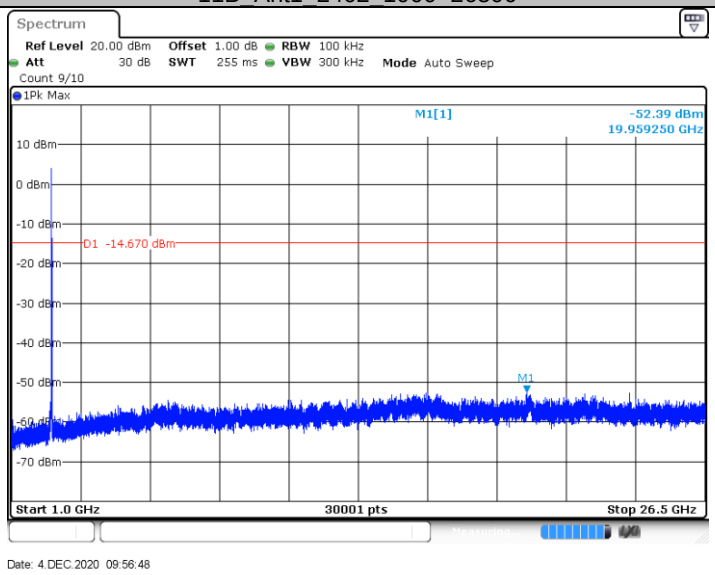
Date: 4.DEC.2020 09:56:34

11B_Ant1_2462_30~1000

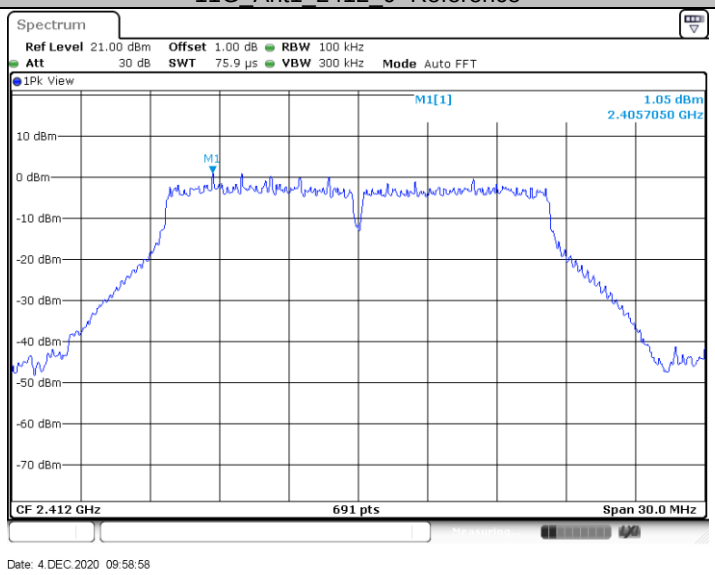


Date: 4.DEC.2020 09:56:40

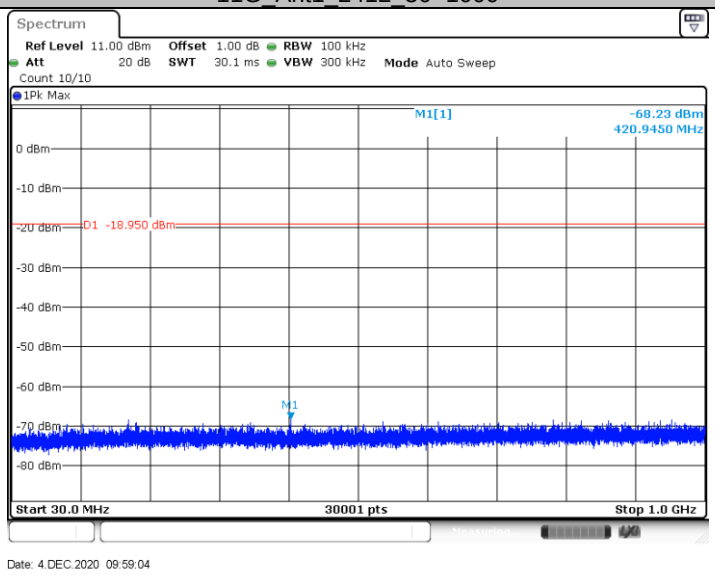
11B_Ant1_2462_1000~26500



11G_Ant1_2412_0~Reference

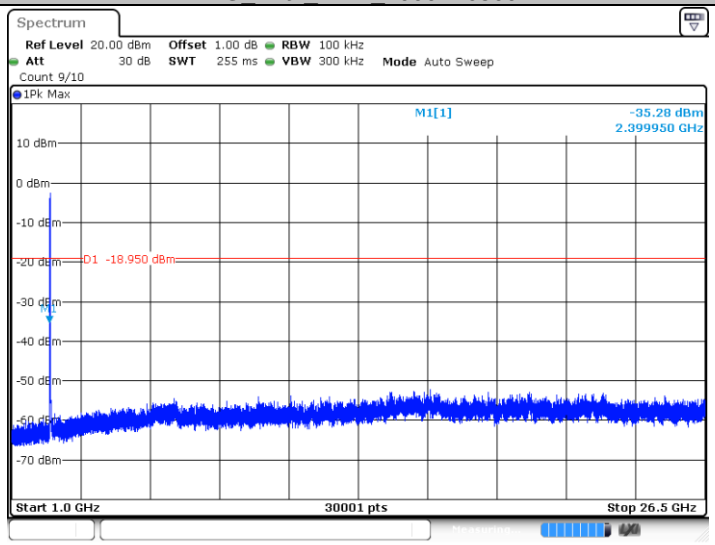


11G_Ant1_2412_30~1000



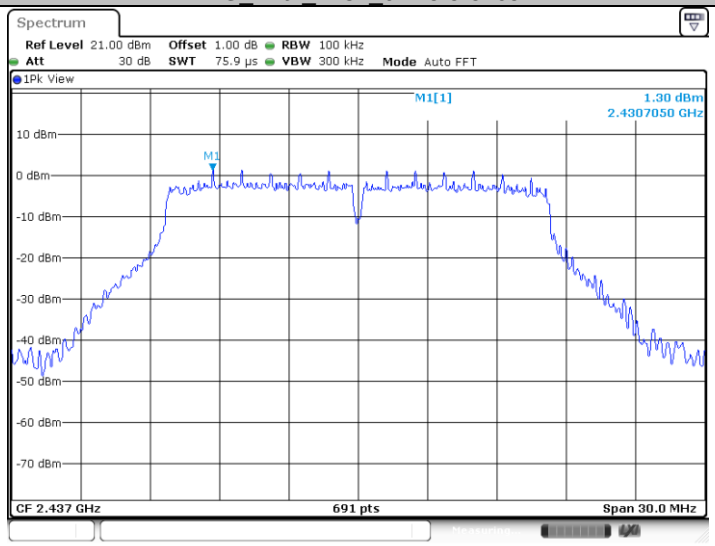
TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

11G_Ant1_2412_1000~26500



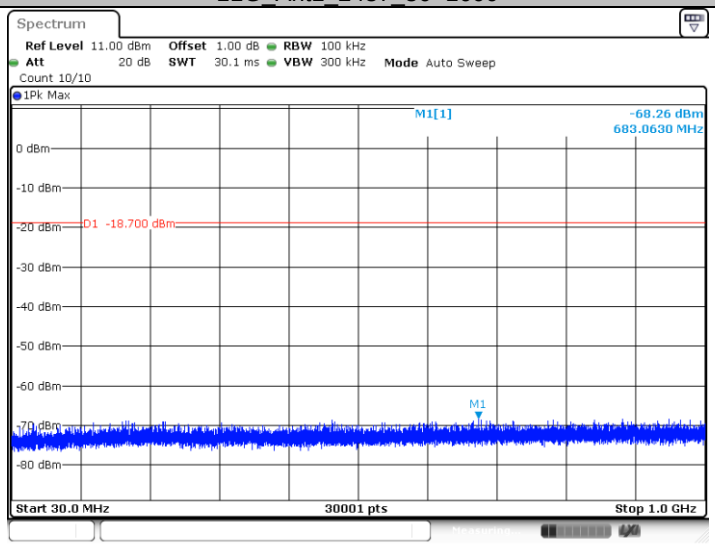
Date: 4.DEC.2020 09:59:12

11G_Ant1_2437_0~Reference



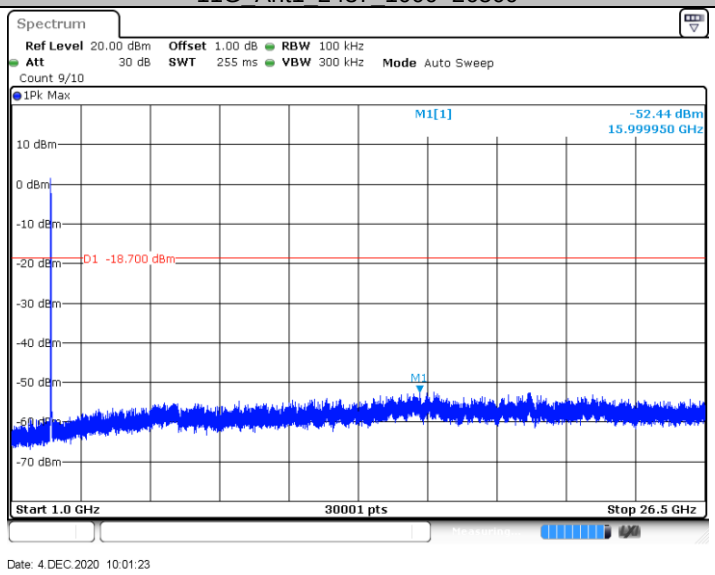
Date: 4.DEC.2020 10:01:09

11G_Ant1_2437_30~1000

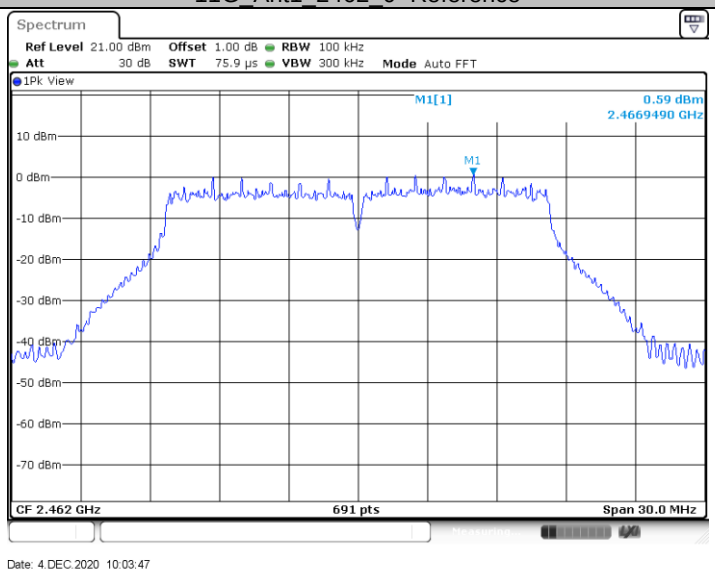


Date: 4.DEC.2020 10:01:15

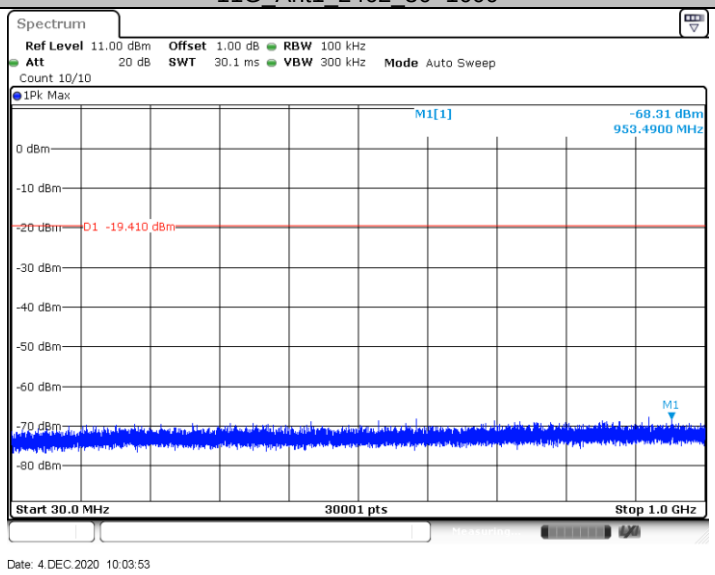
11G_Ant1_2437_1000~26500



11G_Ant1_2462_0~Reference

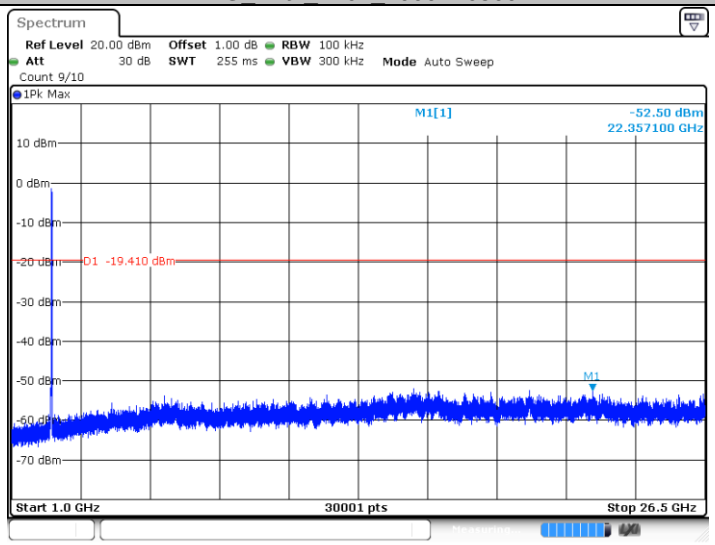


11G_Ant1_2462_30~1000



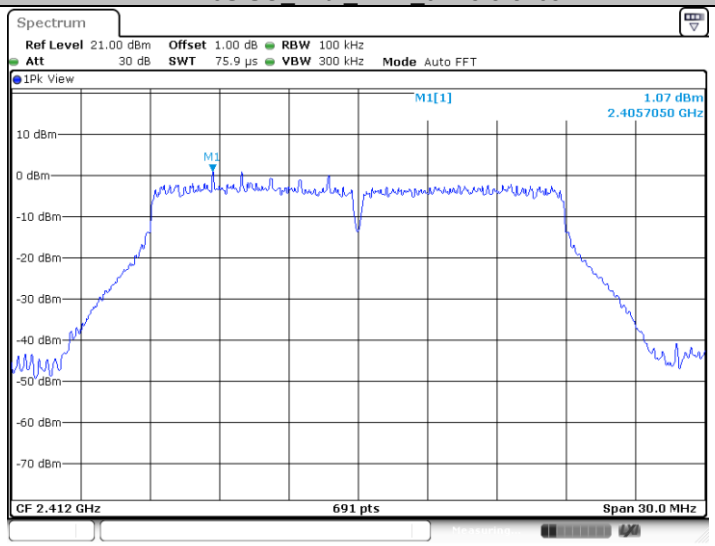
TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

11G_Ant1_2462_1000~26500



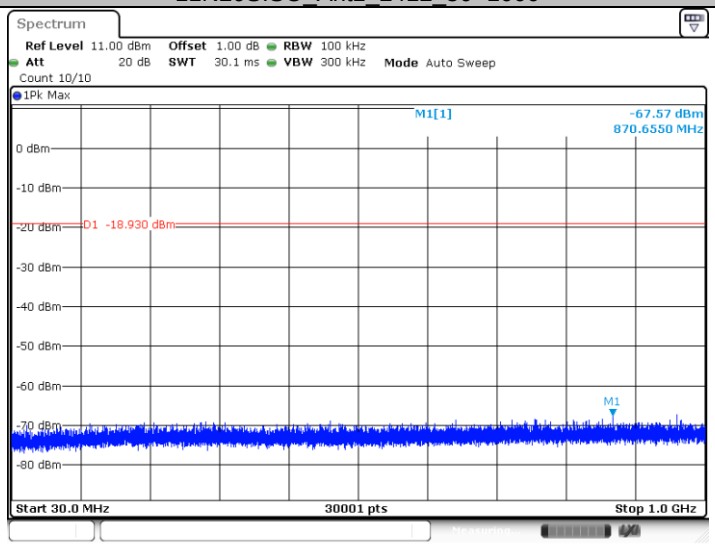
Date: 4.DEC.2020 10:04:01

11N20SISO_Ant1_2412_0~Reference



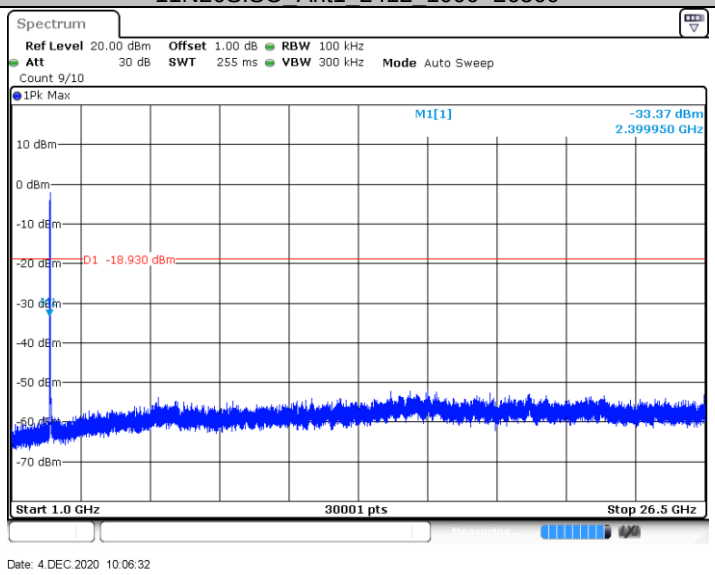
Date: 4.DEC.2020 10:06:19

11N20SISO_Ant1_2412_30~1000

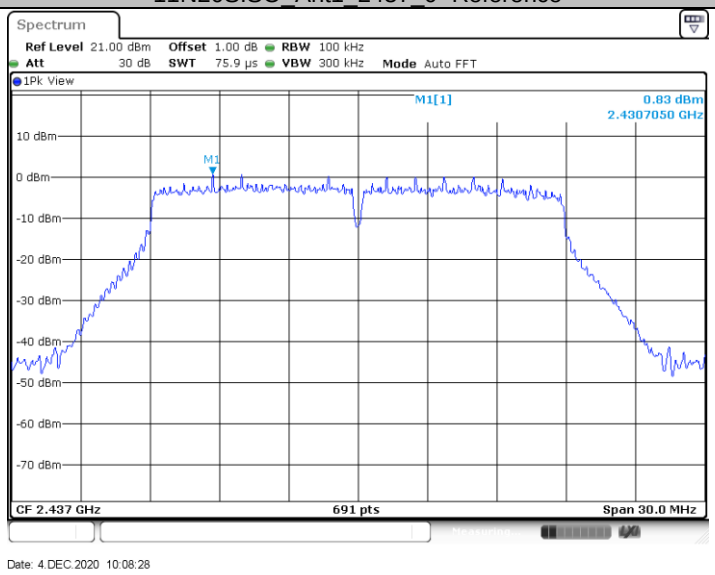


Date: 4.DEC.2020 10:06:25

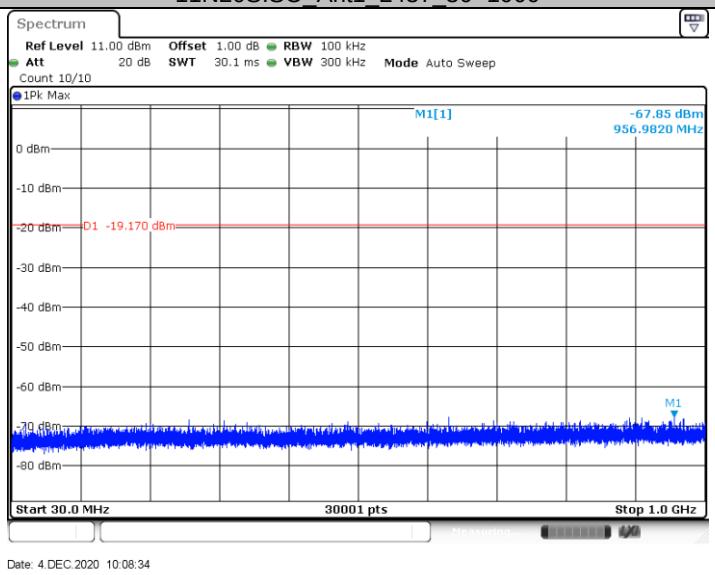
11N20SISO_Ant1_2412_1000~26500



11N20SISO_Ant1_2437_0~Reference

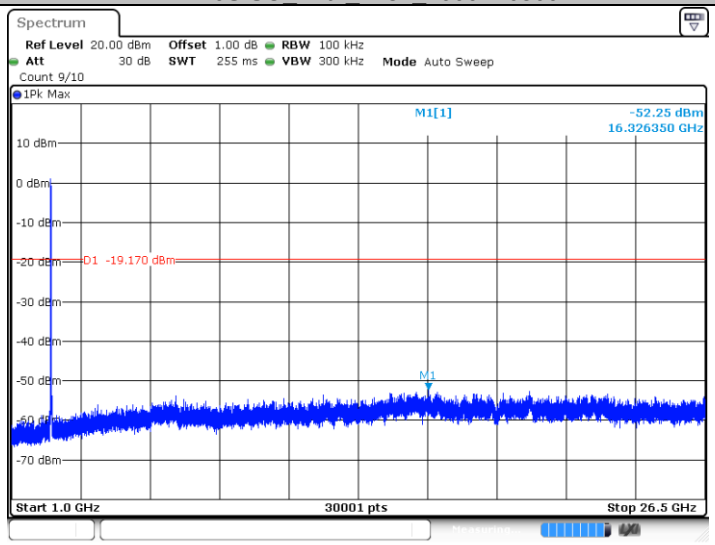


11N20SISO_Ant1_2437_30~1000



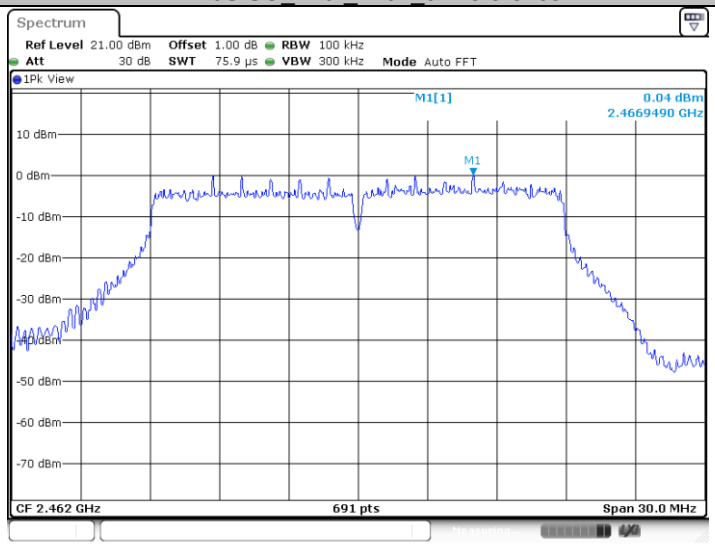
TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

11N20SISO_Ant1_2437_1000~26500



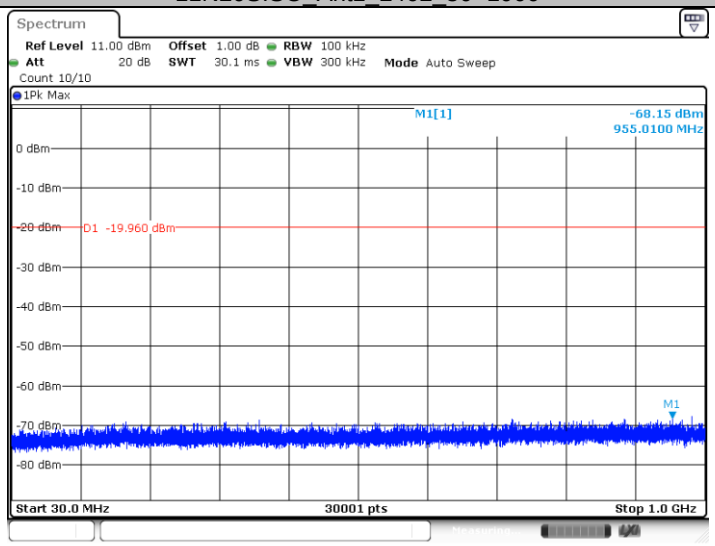
Date: 4.DEC.2020 10:08:42

11N20SISO_Ant1_2462_0~Reference



Date: 4.DEC.2020 10:10:41

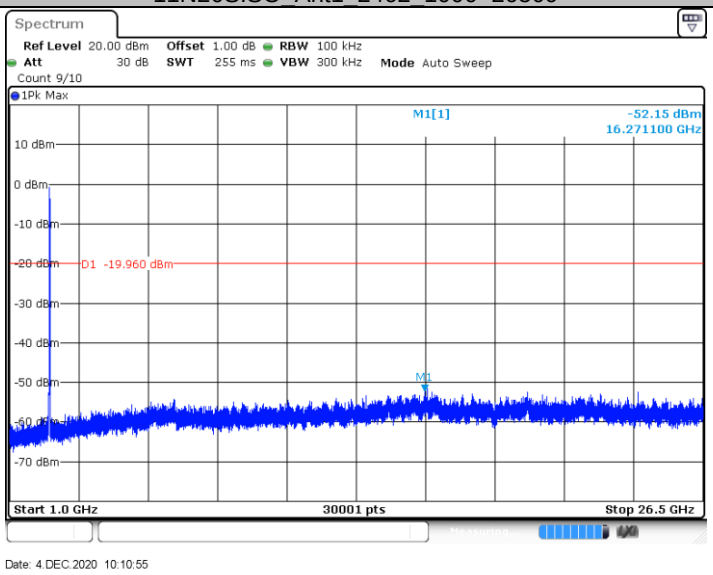
11N20SISO_Ant1_2462_30~1000



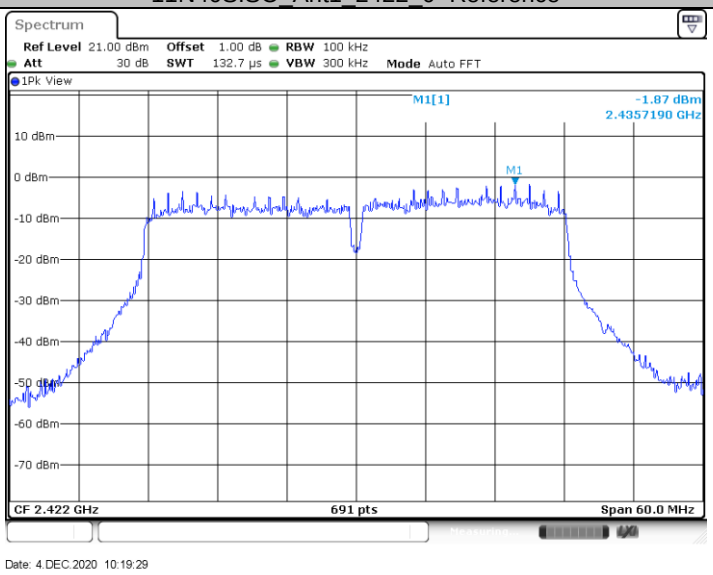
Date: 4.DEC.2020 10:10:47

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

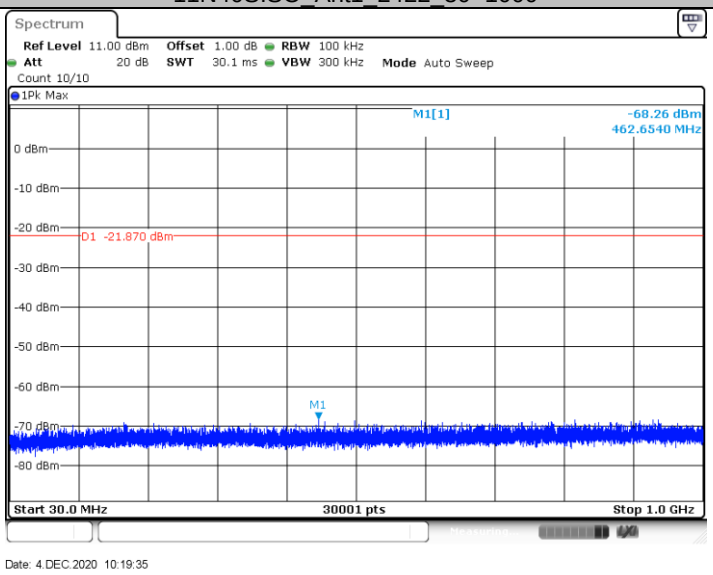
11N20SISO_Ant1_2462_1000~26500



11N40SISO_Ant1_2422_0~Reference

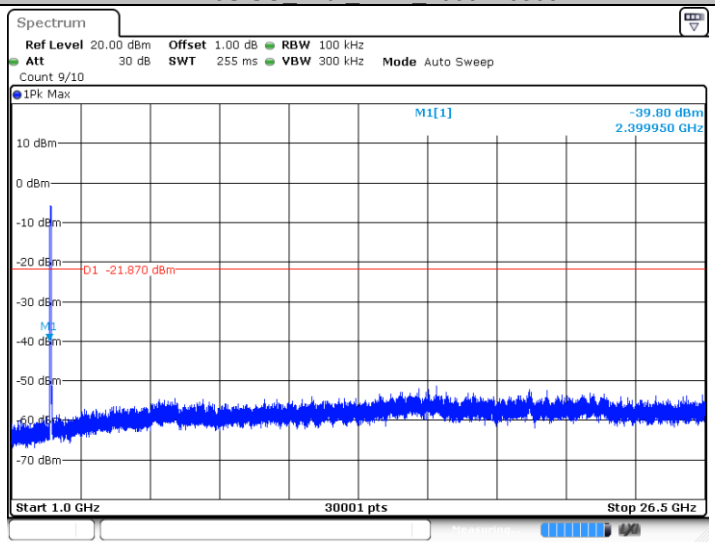


11N40SISO_Ant1_2422_30~1000



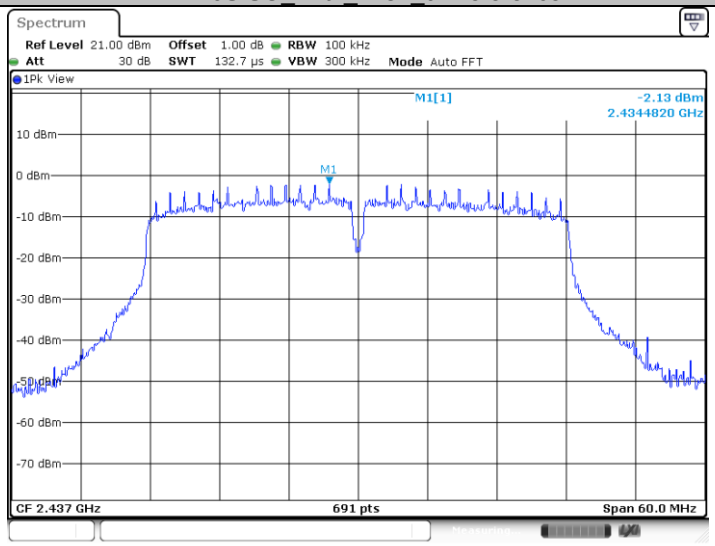
TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

11N40SISO_Ant1_2422_1000~26500



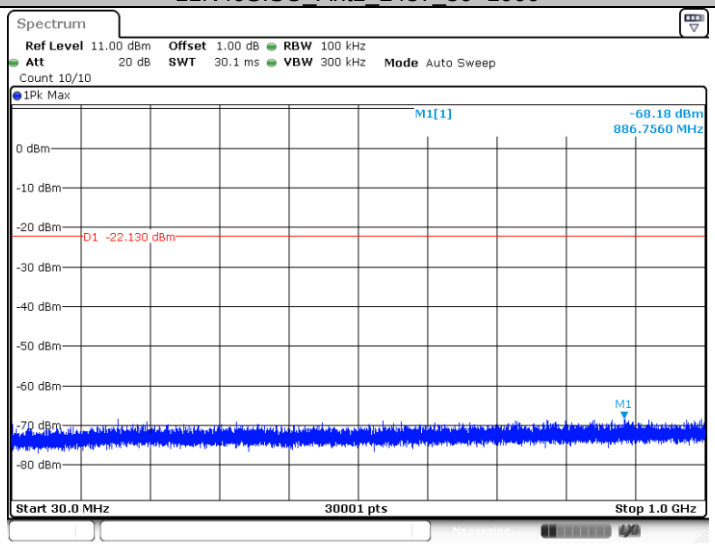
Date: 4.DEC.2020 10:19:43

11N40SISO_Ant1_2437_0~Reference



Date: 4.DEC.2020 10:21:13

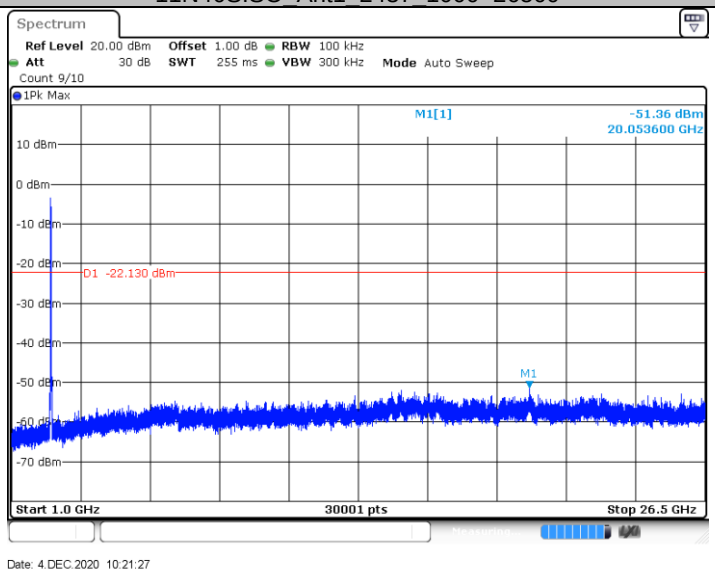
11N40SISO_Ant1_2437_30~1000



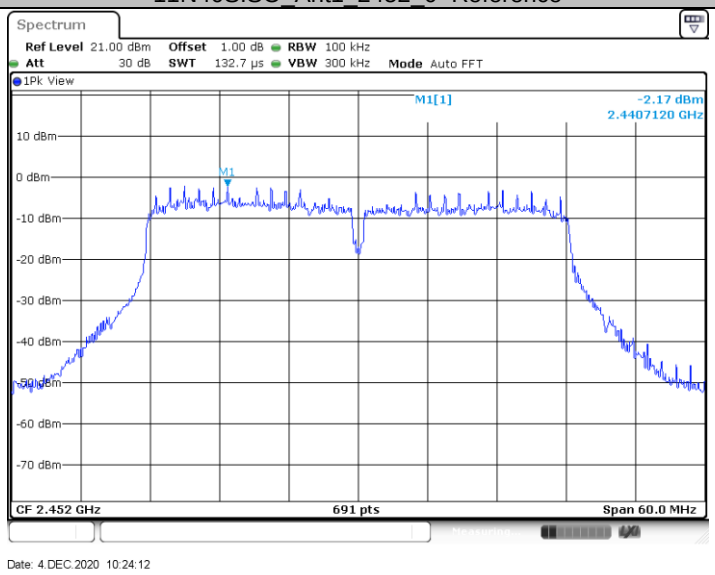
Date: 4.DEC.2020 10:21:19

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

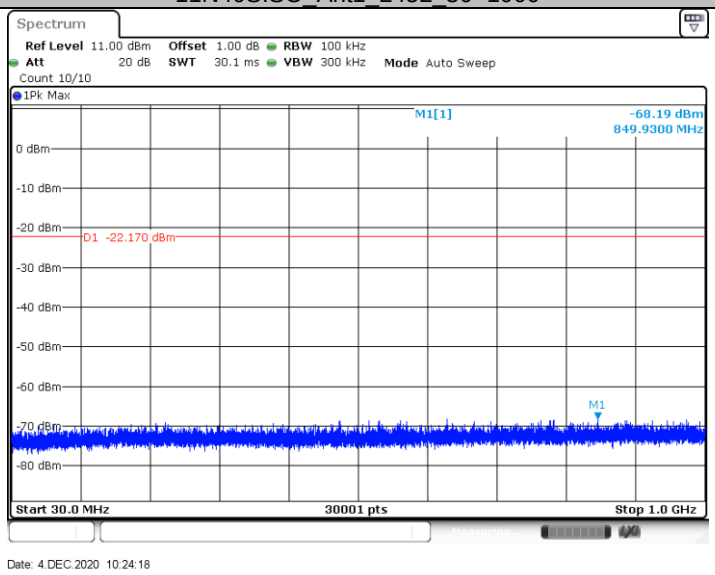
11N40SISO_Ant1_2437_1000~26500



11N40SISO_Ant1_2452_0~Reference

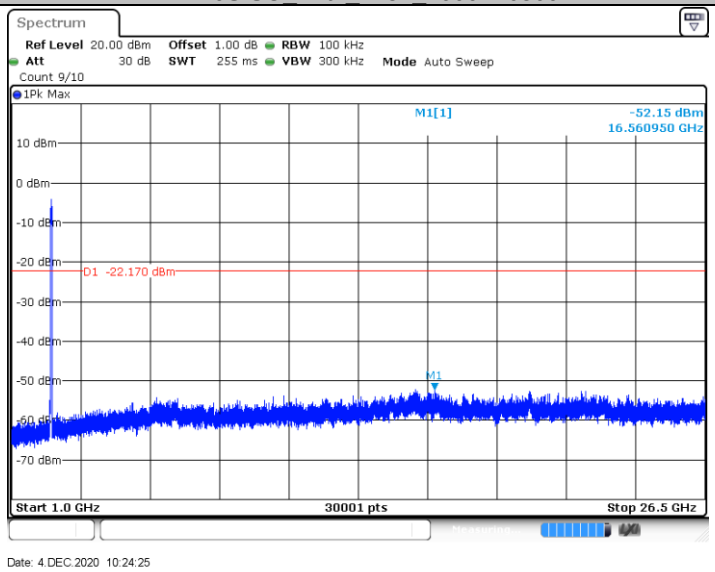


11N40SISO_Ant1_2452_30~1000



TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

11N40SISO_Ant1_2452_1000~26500



TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

9.7 Band edge

Test Method

1. The RF output of EUT was connected to the spectrum analyzer by RF cable. The path loss was compensated to the results for each measurement.
2. Use the following spectrum analyzer settings:
   Span = wide enough to capture the peak level of the in-band emission and all spurious
   RBW = 100 kHz, VBW⩾RBW, Sweep = auto, Detector function = peak, Trace = max hold
3. Allow the trace to stabilize, use the peak and delta measurement to record the result.
   The level displayed must comply with the limit specified in this Section.
4. The level displayed must comply with the limit specified in this Section.
5. Repeat the test at the hopping off and hopping on mode, submit all the plots.

Limit:

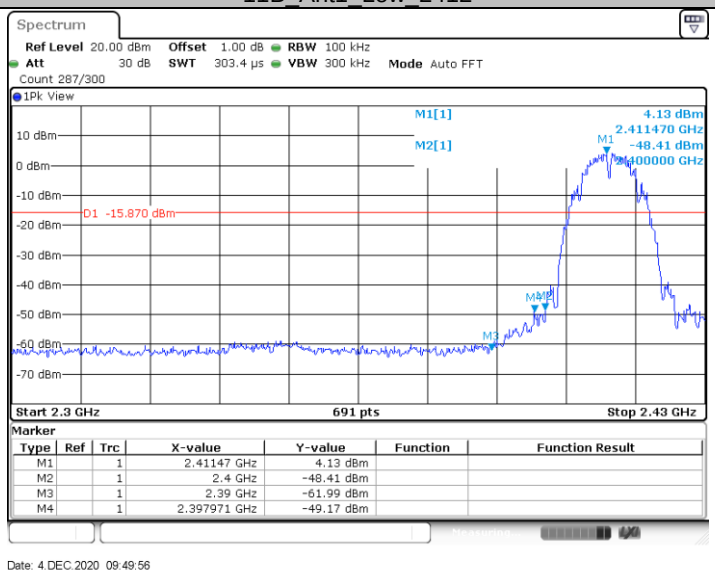
According to §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a) (see Section 15.205(c))

Frequency Range MHz	Limit (dBc)
30-25000	-20

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

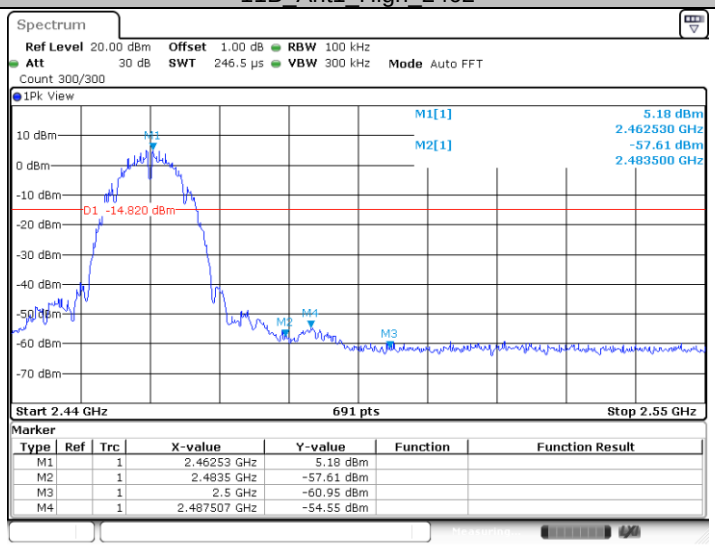
Test result

11B_Ant1_Low_2412



Date: 4.DEC.2020 09:49:56

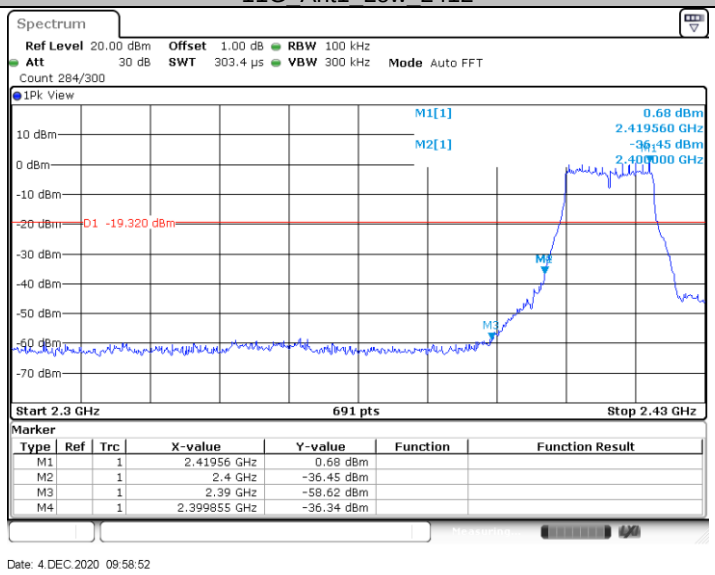
11B_Ant1_High_2462



Date: 4.DEC.2020 09:56:28

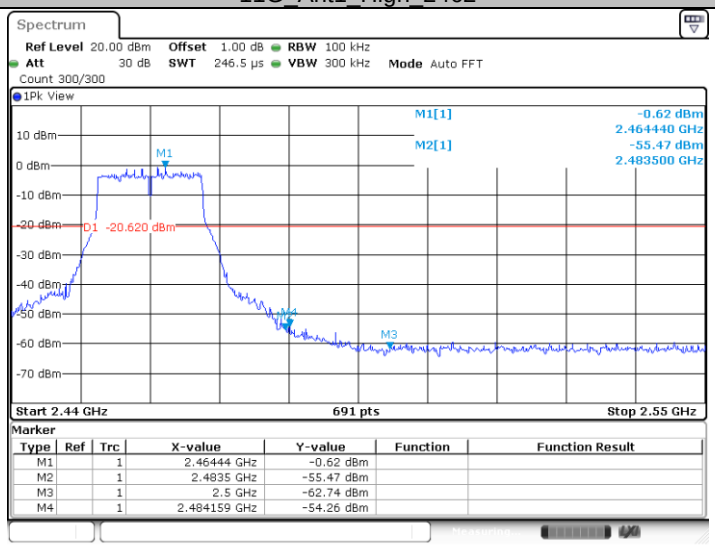
TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

11G_Ant1_Low_2412



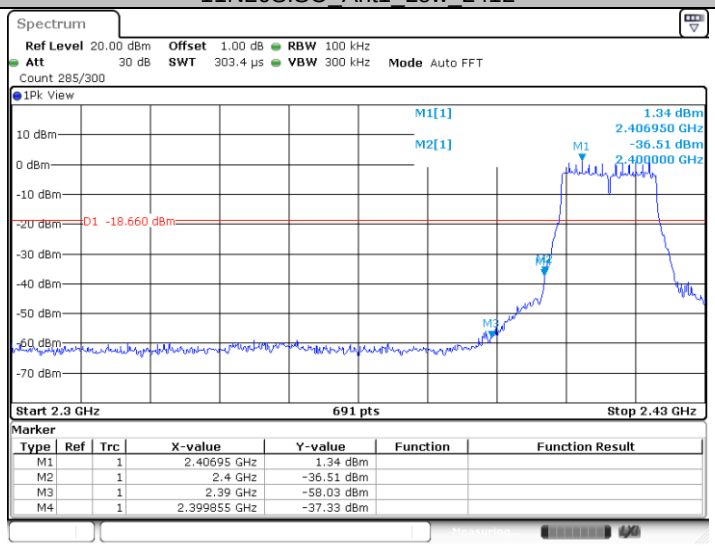
Date: 4.DEC.2020 09:58:52

11G_Ant1_High_2462



Date: 4.DEC.2020 10:03:42

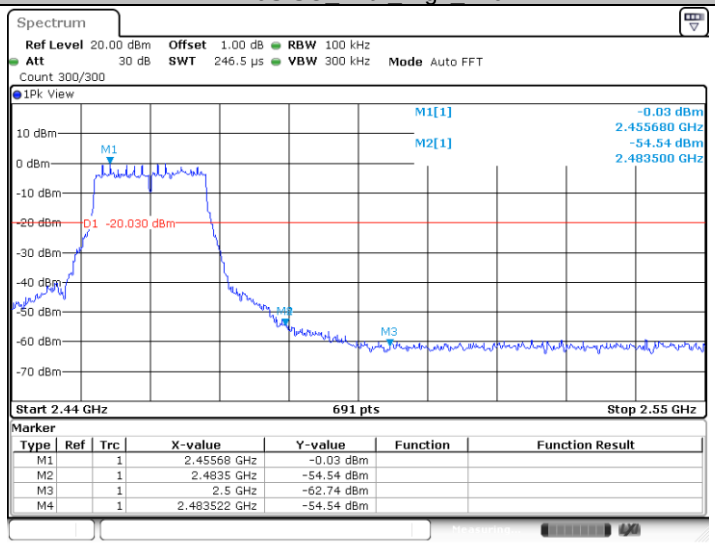
11N20SISO_Ant1_Low_2412



Date: 4.DEC.2020 10:06:13

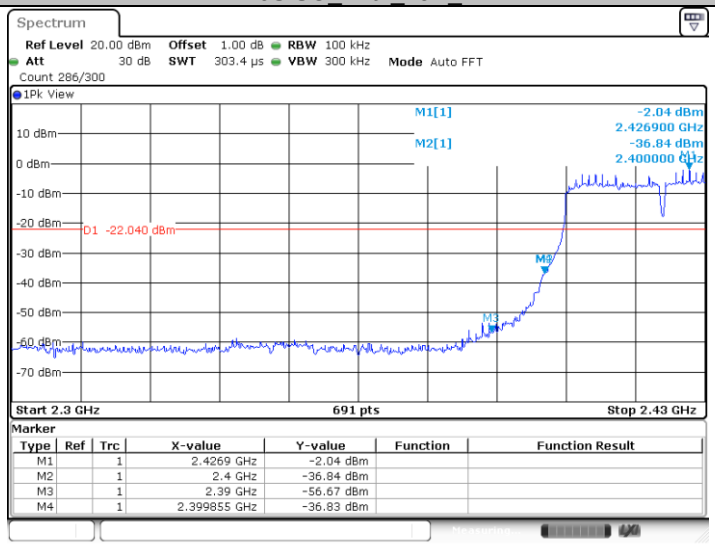
TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

11N20SISO_Ant1_High_2462



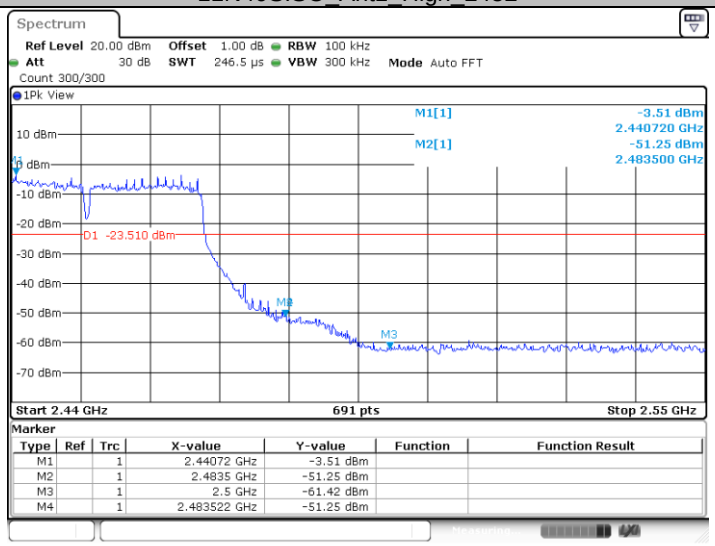
Date: 4.DEC.2020 10:10:35

11N40SISO_Ant1_Low_2422



Date: 4.DEC.2020 10:19:24

11N40SISO_Ant1_High_2452



Date: 4.DEC.2020 10:24:06

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

9.8 Spurious radiated emissions for transmitter

Test Method

1: The EUT was place on a turn table which is 1.5m above ground plane for above 1GHz and 0.8m above ground for below 1GHz at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
2: The EUT was set 3 meters away from the interference – receiving antenna, which was mounted on the top of a variable – height antenna tower.
3: The height of antenna 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.
4: 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.
5: Use the following spectrum analyzer settings According to C63.10:
For Below 1GHz
Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 100 KHz to 120KHz, VBW≥RBW for peak measurement, Sweep = auto, Detector function = peak, Trace = max hold.

For Peak unwanted emissions Above 1GHz:
Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 1MHz, VBW≥RBW for peak measurement, Sweep = auto, Detector function = peak, Trace = max hold.
Procedures for average unwanted emissions measurements above 1000 MHz
a) RBW = 1MHz.
b) VBW \ [3 × RBW].
c) Detector = RMS (power averaging), if [span / (# of points in sweep)] \ RBW / 2. Satisfying this condition can require increasing the number of points in the sweep or reducing the span. If the condition is not satisfied, then the detector mode shall be set to peak.
d) Averaging type = power (i.e., rms) (As an alternative, the detector and averaging type may be set for linear voltage averaging. Some instruments require linear display mode to use linear voltage averaging. Log or dB averaging shall not be used.)
e) Sweep time = auto.
f) Perform a trace average of at least 100 traces if the transmission is continuous. If the transmission is not continuous, then the number of traces shall be increased by a factor of 1 / D, where D is the duty cycle. For example, with 50% duty cycle, at least 200 traces shall be averaged. (If a specific emission is demonstrated to be continuous—i.e., 100% duty cycle—then rather than turning ON and OFF with the transmit cycle, at least 100 traces shall be averaged.)
g) If tests are performed with the EUT transmitting at a duty cycle less than 98%, then a correction factor shall be added to the measurement results prior to comparing with the emission limit, to compute the emission level that would have been measured had the test been performed at 100% duty cycle. The correction factor is computed as follows:
1) If power averaging (rms) mode was used in the preceding step e), then the correction

factor is [10 log (1 / D)], where D is the duty cycle. For example, if the transmit duty cycle was 50%, then 3 dB shall be added to the measured emission levels.
2) If linear voltage averaging mode was used in the preceding step e), then the correction factor is [20 log (1 / D)], where D is the duty cycle. For example, if the transmit duty cycle was 50%, then 6 dB shall be added to the measured emission levels.
3) If a specific emission is demonstrated to be continuous (100% duty cycle) rather than turning ON and OFF with the transmit cycle, then no duty cycle correction is required for that emission.

Limit

The radio emission outside the operating frequency band shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. Radiated emissions which fall in the restricted bands, as defined in section15.205, must comply with the radiated emission limits specified in section 15.209.

Frequency MHz	Field Strength uV/m	Field Strength dBµV/m	Detector
30-88	100	40	QP
88-216	150	43.5	QP
216-960	200	46	QP
960-1000	500	54	QP
Above 1000	500	54	AV
Above 1000	5000	74	PK

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District, Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

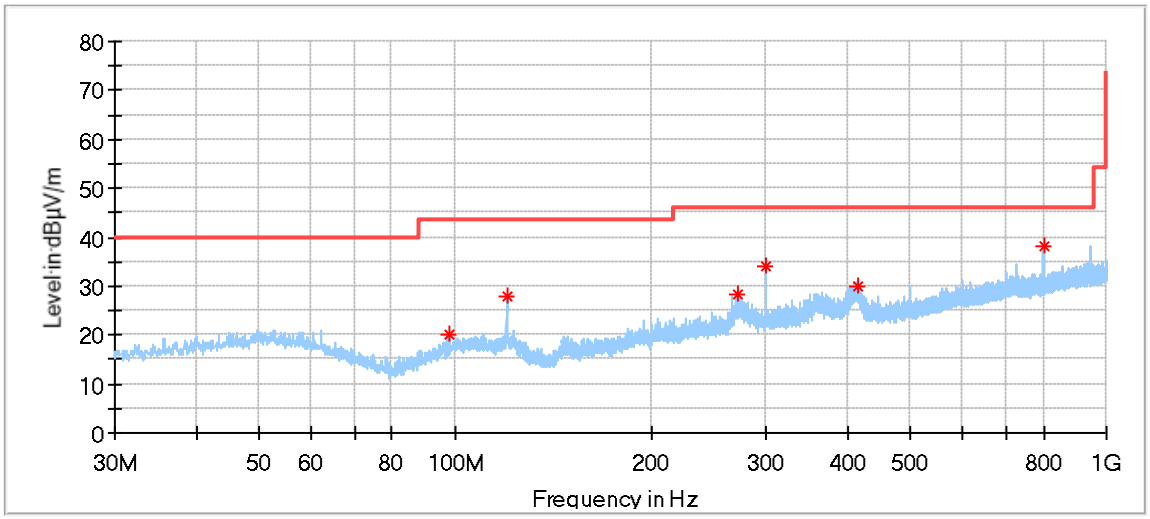
Spurious radiated emissions for transmitter

According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in below table if the peak value complies with average limit.

The only worse case (802.11b) test result is listed in the report.

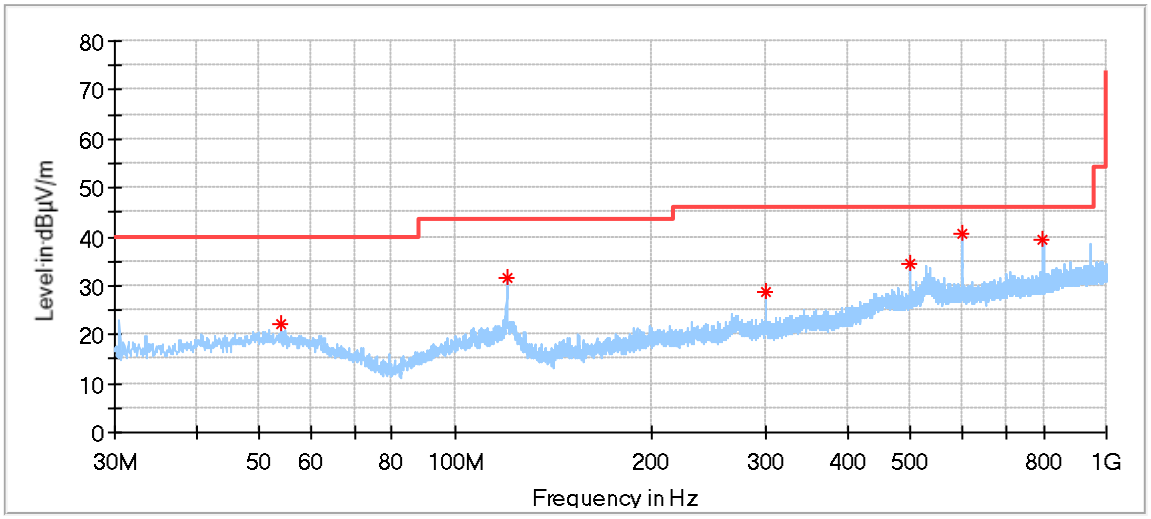
Transmitting spurious emission test result as below:

Below 1G:



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
98.007778	20.14	43.50	23.36	100.0	H	128.0	12.43
119.940556	27.82	43.50	15.68	100.0	H	304.0	10.59
271.476111	28.25	46.00	17.75	100.0	H	120.0	14.22
299.929444	34.04	46.00	11.96	100.0	H	190.0	14.73
416.329444	30.03	46.00	15.97	100.0	H	97.0	17.72
800.018333	38.06	46.00	7.94	100.0	H	182.0	23.65

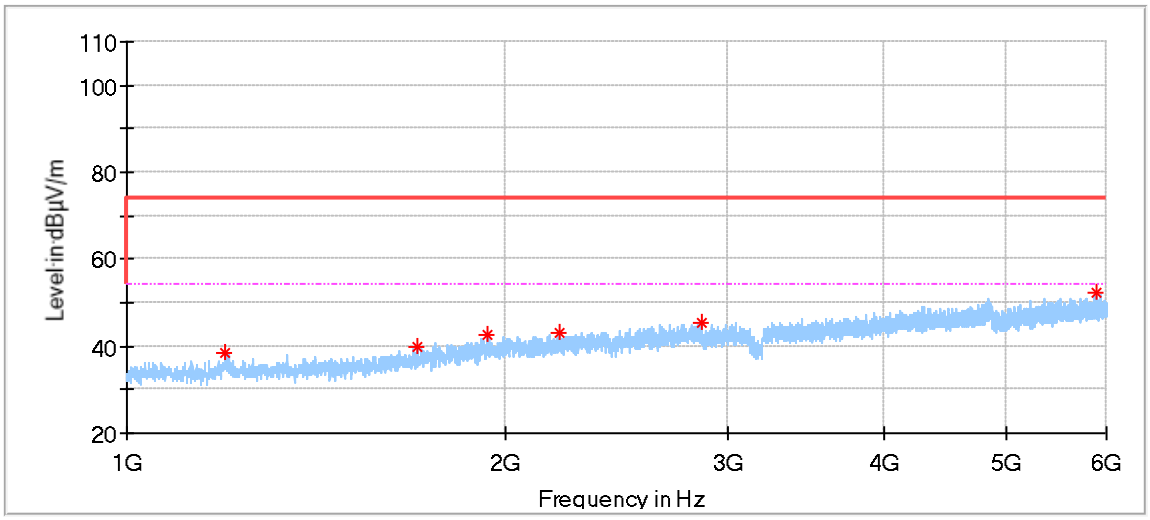
TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299



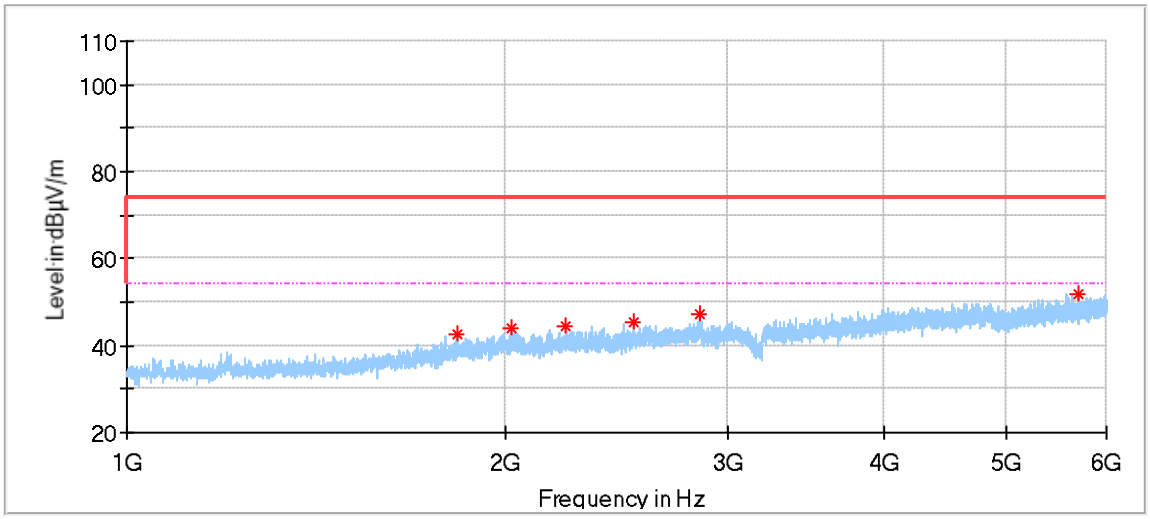
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
41.276250	26.11	40.00	13.89	100.0	V	47.0	17
49.824375	28.52	40.00	11.48	100.0	V	274.0	18
64.435000	23.93	40.00	16.07	100.0	V	255.0	16
95.717500	20.95	43.50	22.55	100.0	V	0.0	16
173.620625	23.10	43.50	20.40	100.0	V	255.0	14
233.215000	25.01	46.00	20.99	100.0	V	173.0	17
934.949375	35.06	46.00	10.94	100.0	V	283.0	30

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

802.11b Modulation
Low channel 2412MHz

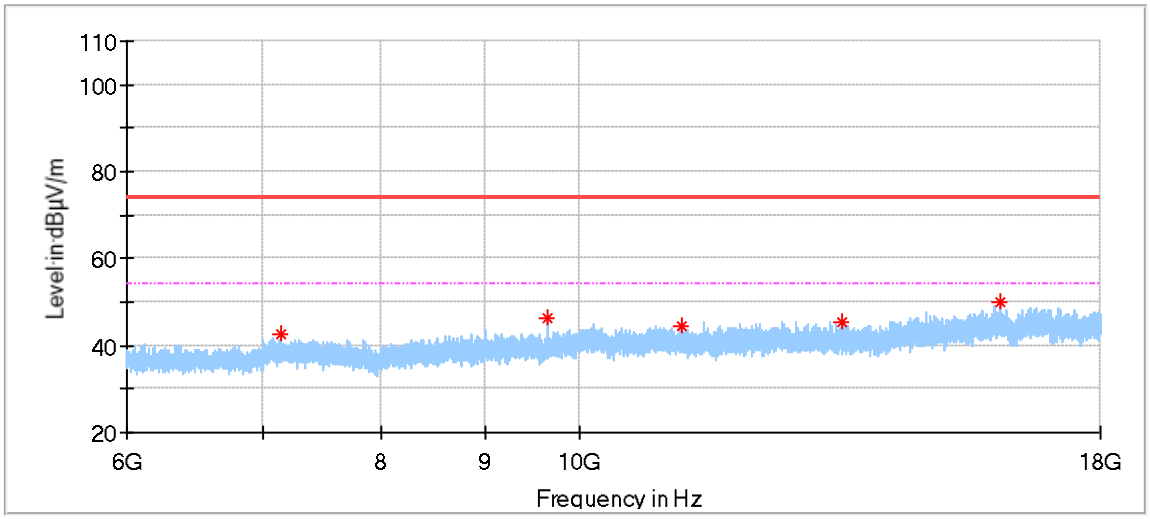


Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1197.500000	38.45	74.00	35.55	150.0	H	11.0	-9.42
1699.000000	39.90	74.00	34.10	150.0	H	330.0	-6.55
1935.000000	42.82	74.00	31.18	150.0	H	345.0	-4.55
2210.000000	42.99	74.00	31.01	150.0	H	236.0	-3.69
2859.500000	45.52	74.00	28.48	150.0	H	125.0	-1.85
5884.000000	52.21	74.00	21.79	150.0	H	275.0	5.57

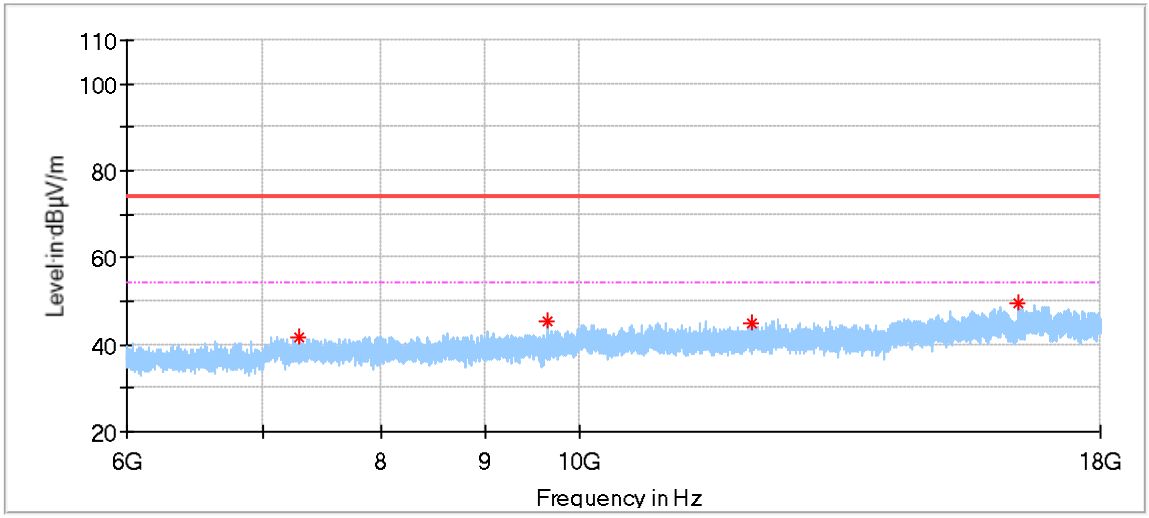


Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1829.500000	42.46	74.00	31.54	150.0	V	95.0	-5.54
2021.000000	43.85	74.00	30.15	150.0	V	5.0	-4.19
2235.000000	44.29	74.00	29.71	150.0	V	95.0	-3.59
2523.000000	45.55	74.00	28.45	150.0	V	306.0	-2.89
2848.500000	47.23	74.00	26.77	150.0	V	5.0	-1.88
5707.000000	51.91	74.00	22.09	150.0	V	142.0	4.81

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299



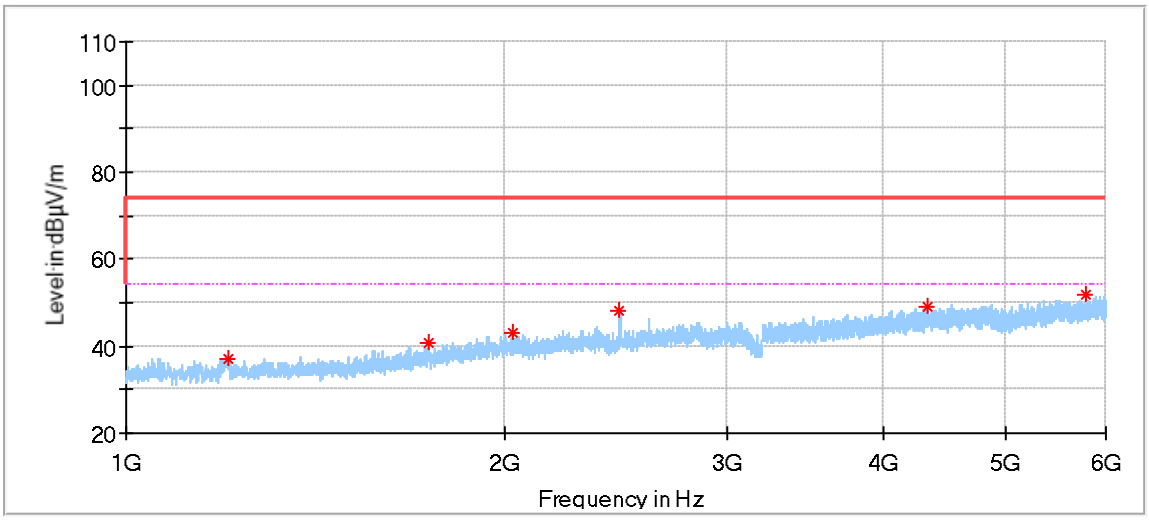
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7137.000000	42.74	74.00	31.26	150.0	H	125.0	4.92
9648.000000	46.40	74.00	27.60	150.0	H	79.0	7.59
11234.500000	44.64	74.00	29.36	150.0	H	56.0	8.48
13434.000000	45.29	74.00	28.71	150.0	H	289.0	9.80
16079.500000	50.02	74.00	23.98	150.0	H	197.0	14.81



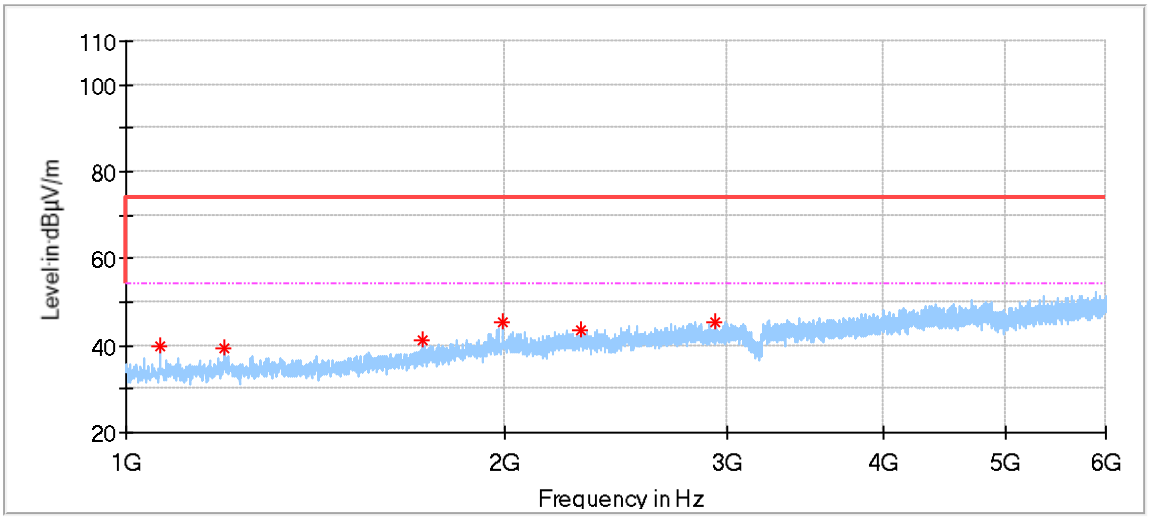
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7287.500000	41.71	74.00	32.29	150.0	V	0.0	5.30
9647.500000	45.53	74.00	28.47	150.0	V	94.0	7.59
12143.500000	45.13	74.00	28.87	150.0	V	0.0	8.72
16420.000000	49.32	74.00	24.68	150.0	V	279.0	15.05

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

802.11b Modulation
Middle channel 2437MHz

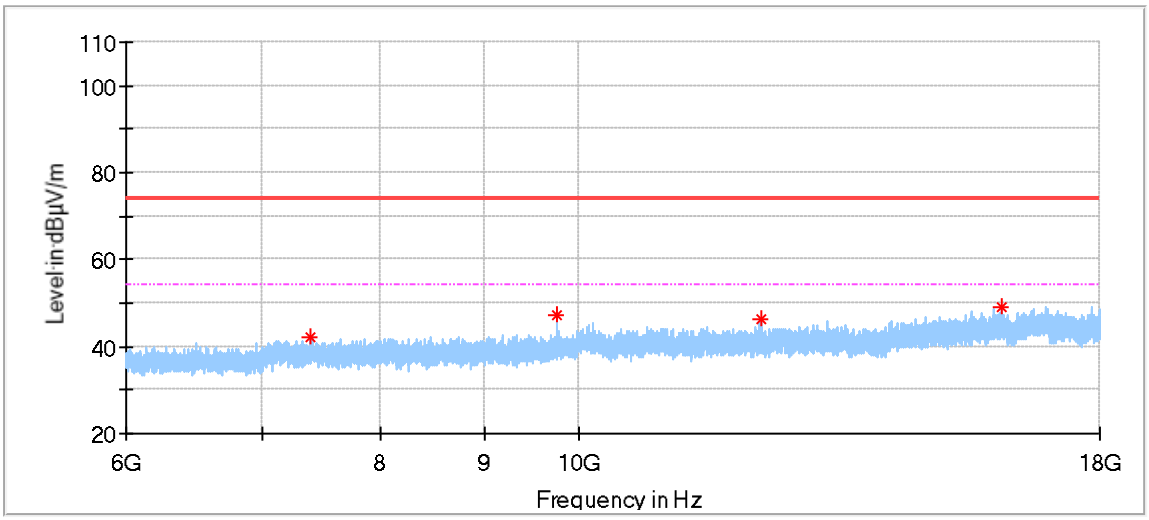


Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1205.500000	37.25	74.00	36.75	150.0	H	210.0	-9.37
1739.000000	40.60	74.00	33.40	150.0	H	4.0	-6.14
2025.500000	43.19	74.00	30.81	150.0	H	62.0	-4.16
2464.500000	47.92	74.00	26.08	150.0	H	280.0	-2.96
4329.000000	49.20	74.00	24.80	150.0	H	358.0	2.04
5782.500000	51.63	74.00	22.37	150.0	H	23.0	5.18

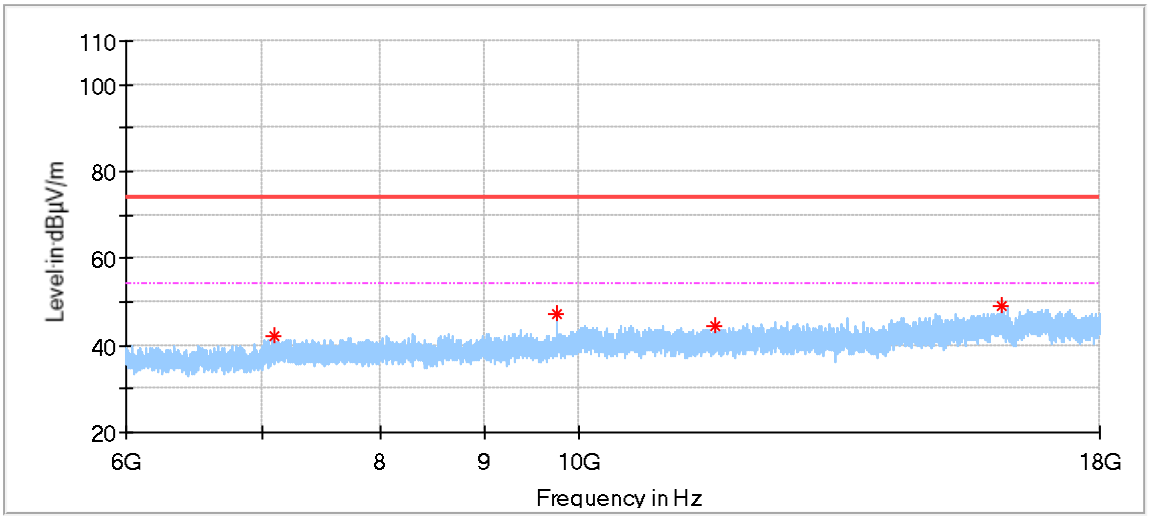


Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1064.000000	39.79	74.00	34.21	150.0	V	351.0	-9.92
1196.500000	39.48	74.00	34.52	150.0	V	38.0	-9.43
1722.000000	41.34	74.00	32.66	150.0	V	85.0	-6.25
1993.500000	45.53	74.00	28.47	150.0	V	306.0	-4.10
2297.500000	43.70	74.00	30.30	150.0	V	322.0	-3.42
2941.000000	45.40	74.00	28.60	150.0	V	345.0	-1.62

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299



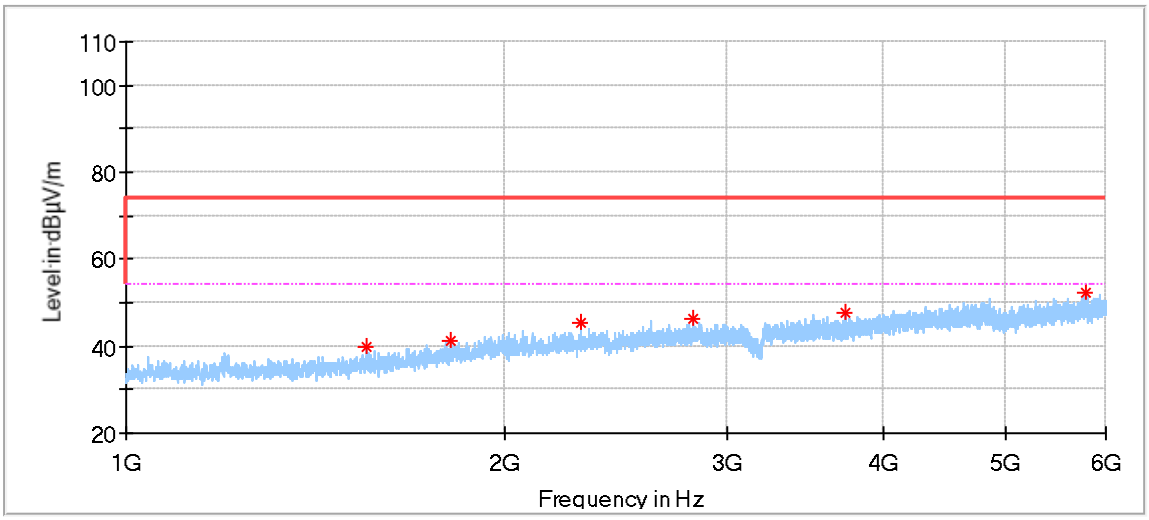
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7393.000000	42.07	74.00	31.93	150.0	H	349.0	5.56
9748.500000	47.20	74.00	26.80	150.0	H	163.0	7.79
12281.000000	46.12	74.00	27.88	150.0	H	349.0	9.08
16098.500000	49.07	74.00	24.93	150.0	H	258.0	14.76



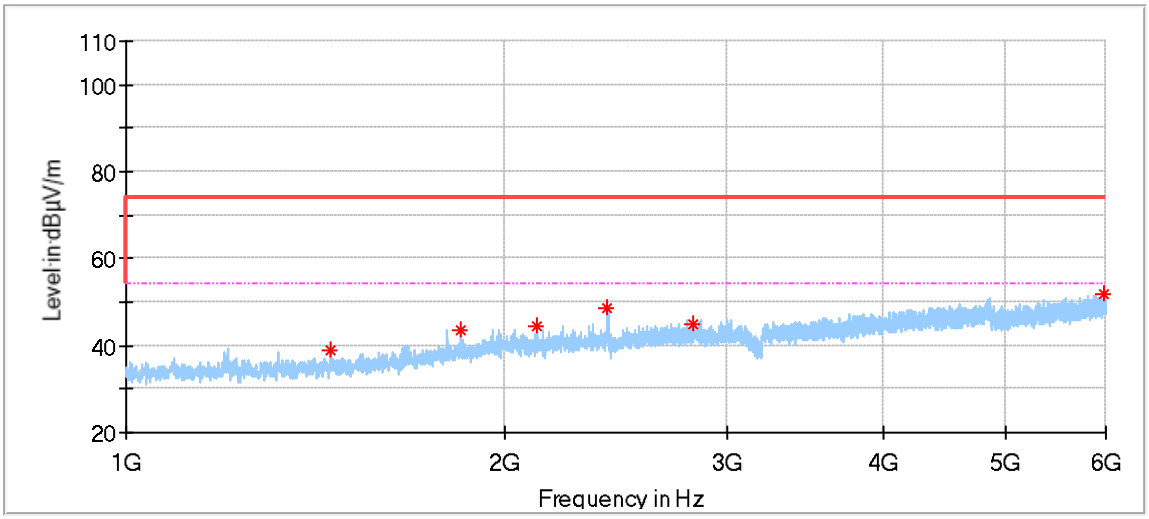
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7084.500000	42.07	74.00	31.93	150.0	V	289.0	4.91
9748.000000	47.28	74.00	26.72	150.0	V	356.0	7.79
11667.500000	44.23	74.00	29.77	150.0	V	336.0	8.45
16111.500000	48.93	74.00	25.07	150.0	V	0.0	14.72

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

802.11b Modulation
High channel 2452MHz

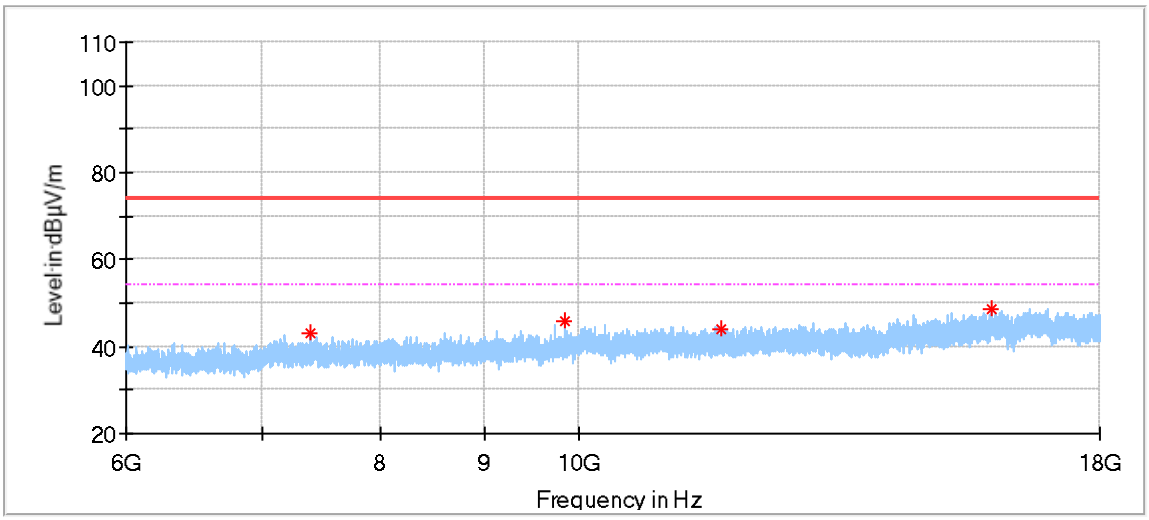


Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1553.000000	40.07	74.00	33.93	150.0	H	179.0	-7.82
1813.500000	41.20	74.00	32.80	150.0	H	255.0	-5.66
2298.500000	45.39	74.00	28.61	150.0	H	349.0	-3.42
2820.500000	46.17	74.00	27.83	150.0	H	232.0	-1.99
3723.500000	47.85	74.00	26.15	150.0	H	319.0	0.45
5786.500000	52.20	74.00	21.80	150.0	H	240.0	5.18

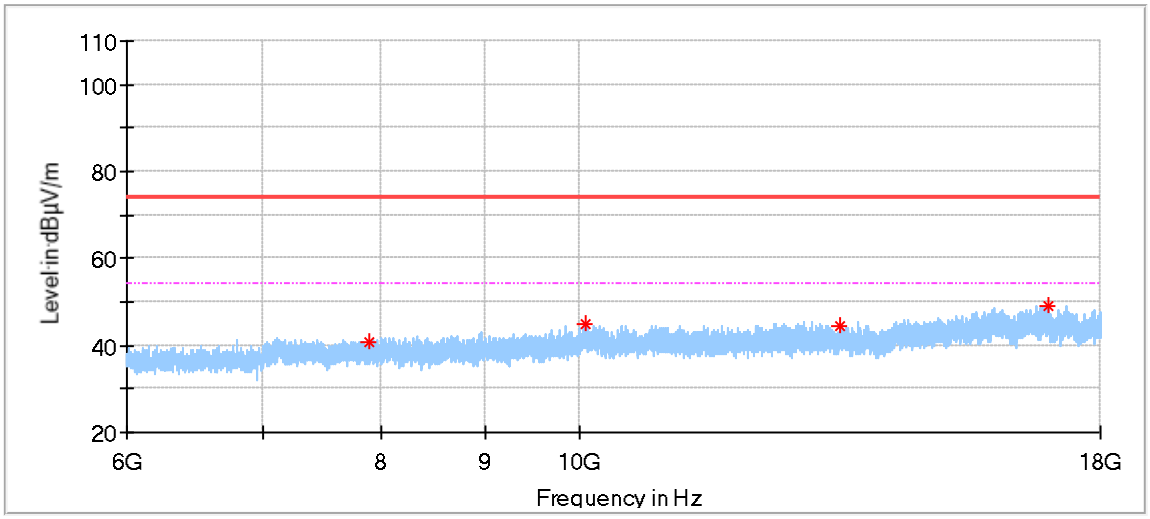


Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1453.500000	38.97	74.00	35.03	150.0	V	189.0	-8.42
1843.000000	43.35	74.00	30.65	150.0	V	69.0	-5.44
2122.500000	44.57	74.00	29.43	150.0	V	260.0	-3.96
2412.500000	48.46	74.00	25.54	150.0	V	213.0	-3.14
2818.500000	44.88	74.00	29.12	150.0	V	15.0	-1.99
5968.000000	51.90	74.00	22.10	150.0	V	344.0	5.47

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7393.500000	43.23	74.00	30.77	150.0	H	35.0	5.56
9848.000000	45.66	74.00	28.34	150.0	H	1.0	7.90
11751.000000	43.86	74.00	30.14	150.0	H	58.0	8.52
15935.500000	48.77	74.00	25.23	150.0	H	174.0	14.05



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7889.500000	40.88	74.00	33.12	150.0	V	189.0	5.64
10072.000000	44.88	74.00	29.12	150.0	V	0.0	9.28
13418.000000	44.49	74.00	29.51	150.0	V	26.0	9.81
16960.500000	49.31	74.00	24.69	150.0	V	327.0	16.45

Remark:

(1) Data of measurement within frequency range18-26GHz are the noise floor or attenuated more than 20dB below the permissible limits or the field strength is too small to be measured, so test data does not present in this report,
(2) Data of measurement within this frequency range shown "--" in the table above means the reading of emissions are the noise floor or attenuated more than 10dB below the permissible limits or the field strength is too small to be measured.
(3) Level= Reading Level + Correction Factor
(4) Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

Below 1GHz: Corrector factor = Antenna Factor + Cable Loss
(The Reading Level is recorded by software which is not shown in the sheet)

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

10 Test Equipment List

Conducted Emission Test

Description	Manufacturer	Model no.	Serial no.	cal. due date
EMI Test Receiver	Rohde & Schwarz	ESR 3	101782	2021-6-29
LISN	Rohde & Schwarz	ENV4200	100249	2021-6-12
Attenuator	Shanghai Huaxiang	TS2-26-3	080928189	2021-6-21
Test software	Rohde & Schwarz	EMC32	Version9.15.00	N/A

Radiated Emission Test

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 26	101269	2021-6-29
High Pass Filter (HPF)	UCL	UCL-BPF1-7G	1504005103	2021-6-28
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9163	707	2021-8-20
Horn Antenna	Rohde & Schwarz	HF907	102295	2021-6-22
Wideband Horn Antenna	Q-PAR	QWH-SL-18-40-K-SG	12827	2021-7-12
Pre-amplifier	Rohde & Schwarz	SCU 18	102230	2021-6-21
Pre-amplifier	Rohde & Schwarz	SCU 40A	100432	2021-7-16
Attenuator	Agilent	8491A	MY39264334	2021-6-21
3m Semi-anechoic chamber	TDK	9X6X6	----	2022-10-28
Test software	Rohde & Schwarz	EMC32	Version 9.15.00	N/A

RF conducted test

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
Signal Analyzer	Rohde & Schwarz	FSV40	101030	2021-6-21
RF Switch Module	Rohde & Schwarz	OSP120/OSP-B157	101226/100851	2021-6-21
Power Splitter	Weinschel	1580	SC319	2021-7-7
RF Switch Module	Rohde & Schwarz	OSP120/OSP-B157	101226/100851	2021-6-21
Test software	Tonscend	System for BT/WIFI	Version 2.6	N/A

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

11 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

System Measurement Uncertainty	
Test Items	Extended Uncertainty
Uncertainty for Conducted Emission 150kHz-30MHz (for test using AMN ENV432 or ENV4200)	3.62dB
Uncertainty for Radiated Spurious Emission 25MHz-3000MHz	Horizontal: 4.81dB; Vertical: 4.89dB;
Uncertainty for Radiated Spurious Emission 3000MHz-18000MHz	Horizontal: 4.69dB; Vertical: 4.68dB;
Uncertainty for Radiated Spurious Emission 18000MHz-40000MHz	Horizontal: 4.89dB; Vertical: 4.87dB;
Uncertainty for Conducted RF test with TS 8997	RF Power Conducted: 1.16dB Frequency test involved: 0.6×10^{-7} or 1%

---The End---

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052, P. R. China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299