

Prüfbericht-Nr.: Test Report No.:	17036832 001	Auftrags-Nr.: Order No.:	164008132	Seite 1 von 67 Page 1 of 67
Kunden-Referenz-Nr.: Client Reference No.:	498233	Auftragsdatum: Order date:	22.09.2013	
Auftraggeber: Client:	3IOS PTE LTD, 35 Kallang Pudding Road, Tong Lee Building, Block A #09-05, 349314, Singapore			
Prüfgegenstand: Test item:	Wireless Headphone			
Bezeichnung / Typ-Nr.: Identification / Type No.:	Motion M1, Stance S1			
Auftrags-Inhalt: Order content:	FCC Certification			
Prüfgrundlage: Test specification:	FCC 47CFR Part 15 Subpart C Section 15.247 FCC 47CFR Part 15 Subpart C Section 15.207 FCC 47CFR Part 15 Subpart C Section 15.209 FCC 47CFR Part 15 Subpart B Section 15.107 FCC 47CFR Part 15 Subpart B Section 15.109			
Wareneingangsdatum: Date of receipt:	22.09.2013			
Prüfmuster-Nr.: Test sample No.:	PS1-11310-0001			
Prüfzeitraum: Testing period:	26.09.2013 – 28.11.2013			
Ort der Prüfung: Place of testing:	Shenzhen Emtex Co., Ltd.			
Prüflaboratorium: Testing laboratory:	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüfergebnis*: Test result*:	Pass			
geprüft von / tested by:		kontrolliert von / reviewed by:		
29.11.2013 Tom Wang / Assistant Project Manager Datum Name / Stellung Unterschrift Date Name / Position Signature		29.11.2013 Sam Lin / Technical Certifier Datum Name / Stellung Unterschrift Date Name / Position Signature		
Sonstiges / Other:				
Zustand des Prüfgegenstandes bei Anlieferung: Condition of the test item at delivery:		Prüfmuster vollständig und unbeschädigt Test item complete and undamaged		
* Legende: 1 = sehr gut 2 = gut 3 = befriedigend 4 = ausreichend 5 = mangelhaft P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet Legend: 1 = very good 2 = good 3 = satisfactory 4 = sufficient 5 = poor P(ass) = passed a.m. test specification(s) F(ail) = failed a.m. test specification(s) N/A = not applicable N/T = not tested				
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.				

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TEST SUMMARY

5.1.1 ANTENNA REQUIREMENT

RESULT: Pass

5.1.2 PEAK OUTPUT POWER

RESULT: Pass

5.1.3 6dB BANDWIDTH

RESULT: Pass

5.1.4 POWER DENSITY

RESULT: Pass

5.1.5 CONDUCTED SPURIOUS EMISSIONS MEASURED IN 100KHZ BANDWIDTH

RESULT: Pass

5.1.6 RADIATED SPURIOUS EMISSIONS

RESULT: Pass

5.1.7 CONDUCTED EMISSIONS

RESULT: Pass

5.1.8 RADIATED EMISSIONS

RESULT: Pass

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1. General Remarks

1.1 Complementary Materials

None.

2. Test Sites

2.1 Test Facilities

Shenzhen Emtex Co., Ltd.

Bldg 69, Majialong Industry Zone, Nanshan District, Shenzhen, P.R. China, 518057

FCC Registration No.: 406365

The tests at the test site have been conducted under the supervision of a TÜV engineer.

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2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Kind of Equipment	Manufacturer	Type	S/N	Calibrated until
Spurious Emission and Radiated Emission				
EMI Test Receiver	Rohde & Schwarz	ESU	1302.6005.26	May 28, 2014
Pre-Amplifier	HP	8447D	2944A07999	May 28, 2014
Bilog Antenna	Schwarzbeck	VULB9163	142	May 10, 2014
Loop Antenna	ARA	PLA-1030/B	1029	May 10, 2014
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170399	May 10, 2014
Horn Antenna	Schwarzbeck	BBHA 9120	D143	May 10, 2014
Cable	Schwarzbeck	AK9513	ACRX1	May 28, 2014
Cable	Rosenberger	N/A	FP2RX2	May 28, 2014
Cable	Schwarzbeck	AK9513	CRPX1	May 28, 2014
Cable	Schwarzbeck	AK9513	CRRX2	May 28, 2014
Signal Generator	HP	8648A	3625U00573	May 28, 2014
Radio Spectrum & Power Test				
EMI Test Receiver	Rohde & Schwarz	ESU	1302.6005.26	May 28, 2014
Spectrum Analyzer	Agilent	E4407B	88156318	May 28, 2014
Conducted Spurious Emission				
Spectrum Analyzer	Agilent	E4407B	88156318	May 28, 2014

2.3 Traceability

All measurement equipment calibrations are traceable to NIM (National Institute of Metrology) or where calibration is performed in other countries, to equivalent nationally recognized standards organizations.

2.4 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

2.5 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements are $\pm 3\text{dB}$.

2.6 Location of Original Data

The original copies of all test data taken during actual testing were included in this report and delivered to the applicant. A copy has been retained in the TÜV Rheinland (Shenzhen) file for certification follow-up purposes.

2.7 Status of Facility Used for Testing

The Shenzhen Emtek Co., Ltd..located at Bldg 69,Majialong Industry Zone,Nanshan District, Shenzhen, P.R. China, is listed on the US Federal Communications Commission list of facilities approved to perform measurements.

3. General Product Information

3.1 Product Function and Intended Use

The EUTs are a wireless headphone with bluetooth function. It operates at 2.4GHz ISM frequency band. The manufacture declares that the product only work in Bluetooth 4.0 low energy mode. BDR/EDR mode is disabled. Two models are identical except the model name and functional button, Stance S1 has additional amplifier function and 2*AAA battery function compare to Motion M1. For details refer to the User Manual, Technical Description and Circuit Diagram.

3.2 Ratings and System Details

Table 2: Technical Specification of EUT

Technical Specification	Value	
Product Name	Wireless Headphone	
Model number	Motion M1, Stance S1	
FCC ID:	2AAZ3-20130913001	
Operating Frequency	2402-2480MHz	
Channel Bandwidth	<1MHz	
Extreme Temperature Range	-20°C ~ +55°C	
Operation Voltage	DC5.0V	from USB for charging , apply for Motion M1 and Stance S1
	DC 3.7V	from Internal rechargeable lithium battery ,apply for Motion M1 and Stance S1
	DC3V	from 2*AAA battery ,apply for Stance S1
Modulation	GFSK	
Number of channel	40	
Chanel spacing	2MHz	
Bluetooth version	Bluetooth 4.0 (single mode)	
RF Power (peak)	7.30dBm	
Antenna type and Antenna Gain	PCB Antenna 0dBi	

3.3 Independent Operation Modes

The basic operation modes are:

- A. Bluetooth (Low Energy mode)
 - 1. Transmitting
 - 2. Receiving
- B. Aux IN
- C. Charging
- D. Off

3.4 Noise Generating and Noise Suppressing Parts

Refer to the Circuit Diagram.

3.5 Submitted Documents

- | | |
|--------------------|----------------------|
| - Block Diagram | - Circuit Diagram |
| - Bill of Material | - Instruction Manual |
| - Rating Label | - Model Differences |

4. Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

The equipment under test (EUT) was configured to measure its maximum power level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Test operation refers to test setup in chapter 5.

Due to difference described in clause 3.1, all tests were applied on Stance S1.

All tests were applied on the low (2402MHz), middle (2440MHz) & high (2480MHz) channels.

Table 3: RF channel and frequency of EUT

RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)
0	2402.00	10	2422.00	20	2442.00	30	2462.00
1	2404.00	11	2424.00	21	2444.00	31	2464.00
2	2406.00	12	2426.00	22	2446.00	32	2466.00
3	2408.00	13	2428.00	23	2448.00	33	2468.00
4	2410.00	14	2430.00	24	2450.00	34	2470.00
5	2412.00	15	2432.00	25	2452.00	35	2472.00
6	2414.00	16	2434.00	26	2454.00	36	2474.00
7	2416.00	17	2436.00	27	2456.00	37	2476.00
8	2418.00	18	2438.00	28	2458.00	38	2478.00
9	2420.00	19	2440.00	29	2460.00	39	2480.00

4.3 Special Accessories and Auxiliary Equipment

The EUT was tested together with the following accessories:

Description	Manufacturer	Part No.	S/N
iPod	Apple	A1324	N/A
AC/DC adapter	Lenovo	Think Centre 8701	8701A53L3BC108
PC	DELL	D11M	CN-0CV772-0887-31L-5219
Monitor	LENOVO	9227-AE6	4M0293084302824

The EUT was tested with following cables:

Interface(s)/Port(s):	Max. cable length, shielding	Cable classification
USB Line	non-shielded port, 1m	USB Input
Line Input	non-shielded port, 2m	Audio Input

4.4 Countermeasures to Achieve ERM Compliance

The test sample which has been tested contained the noise suppression parts as described in the Technical Construction File (TCF). No additional measures were employed to achieve compliance.

4.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test

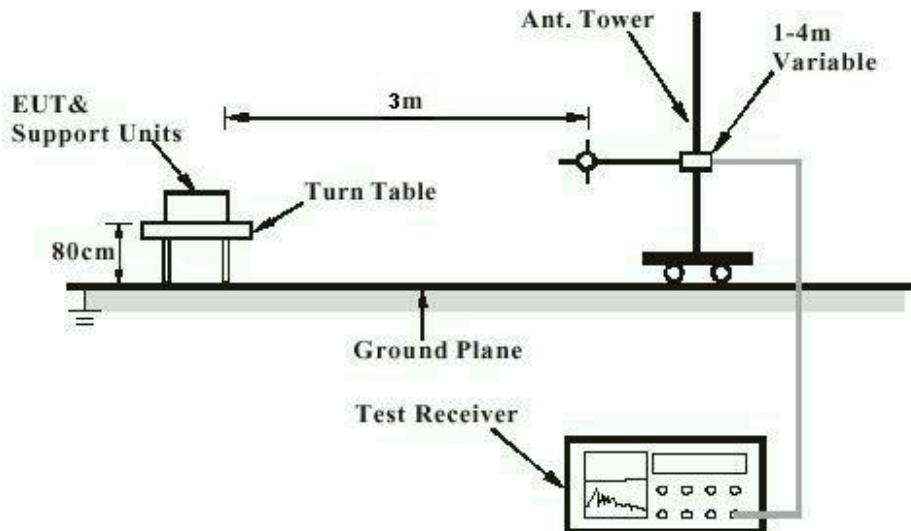
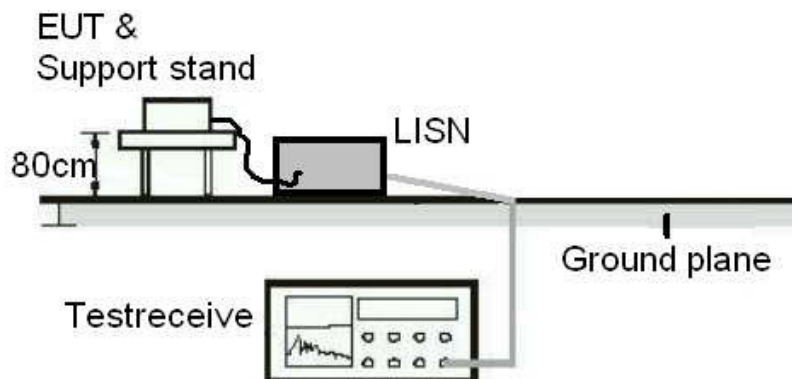


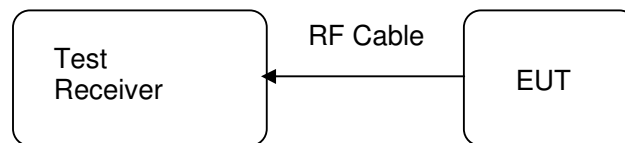
Diagram of Measurement Equipment Configuration for Conduction Measurement



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Diagram of Measurement Equipment Configuration for Conducted Transmitter Measurement



5. Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT:

Pass

Test date	:	2013-10-26
Test standard	:	FCC Part 15.247(b)(4) and Part 15.203
Limit	:	the use of antennas with directional gains that do not exceed 6 dBi

According to the manufacturer declared, the EUT has an internal PCB antenna, the directional gain of antenna is 0dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Therefore the EUT is considered sufficient to comply with the provision.

Refer to EUT photos for details.

5.1.2 Peak Output Power

RESULT:

Pass

Test date : 2013-10-15
Test standard : FCC Part 15.247(b)(3)
Basic standard : ANSI C63.10: 2009
Limit : 1 Watt
Kind of test site : Shielded room

Test setup

Test Channel : Low/ Middle/ High
Operation Mode : A1
Ambient temperature : 25°C
Relative humidity : 55%
Atmospheric pressure : 101 kPa

Table 4: Test result of Peak Output Power

Channel	Channel Frequency (MHz)	Peak Output Power		Limit
		(dBm)	(W)	(W)
Low Channel	2402	6.71	0.00469	1
Middle Channel	2440	7.30	0.00537	1
High Channel	2480	6.51	0.00448	1

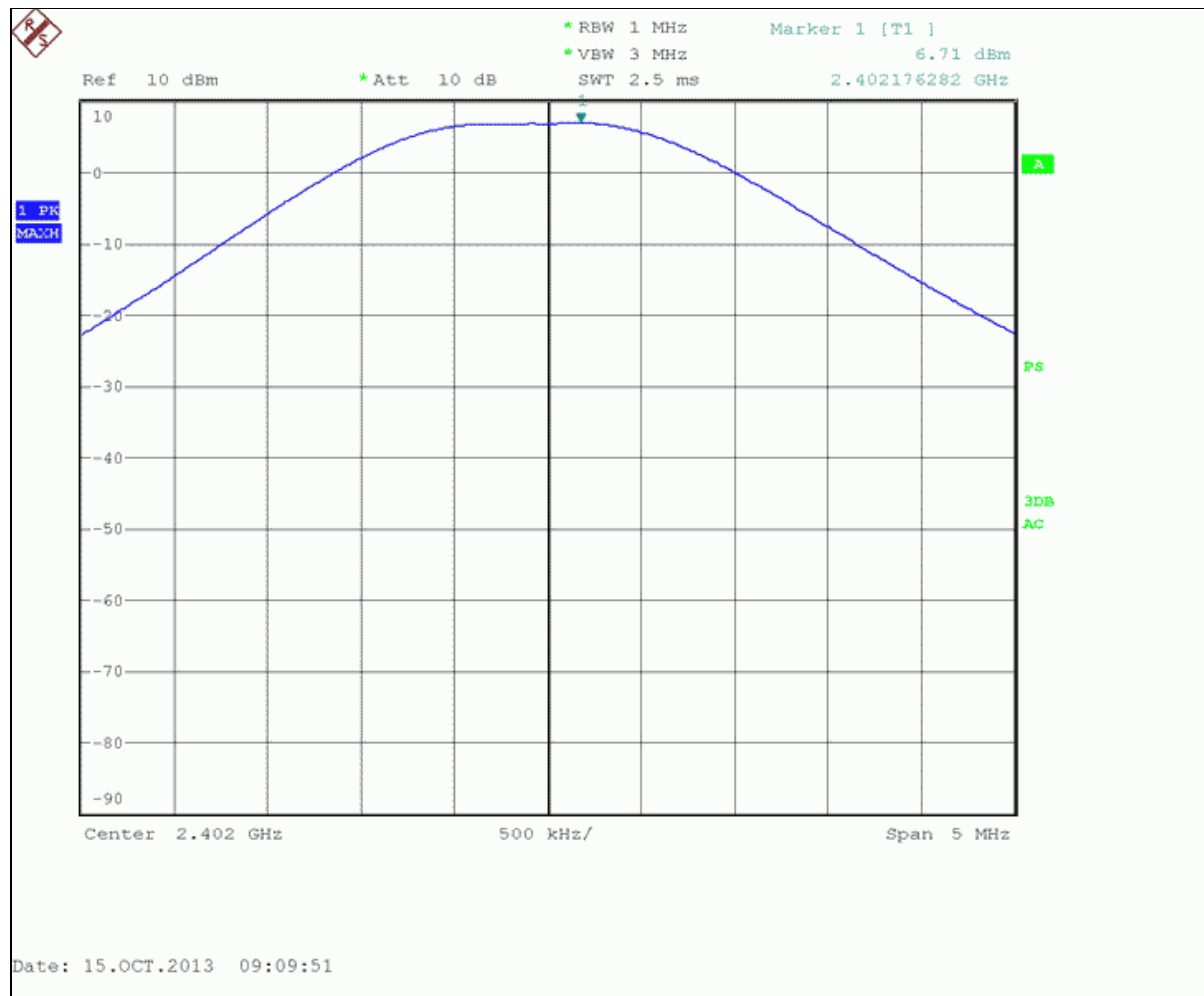
Remark: RBW is 1MHz

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Test Plot of Peak Output Power, GFSK modulation

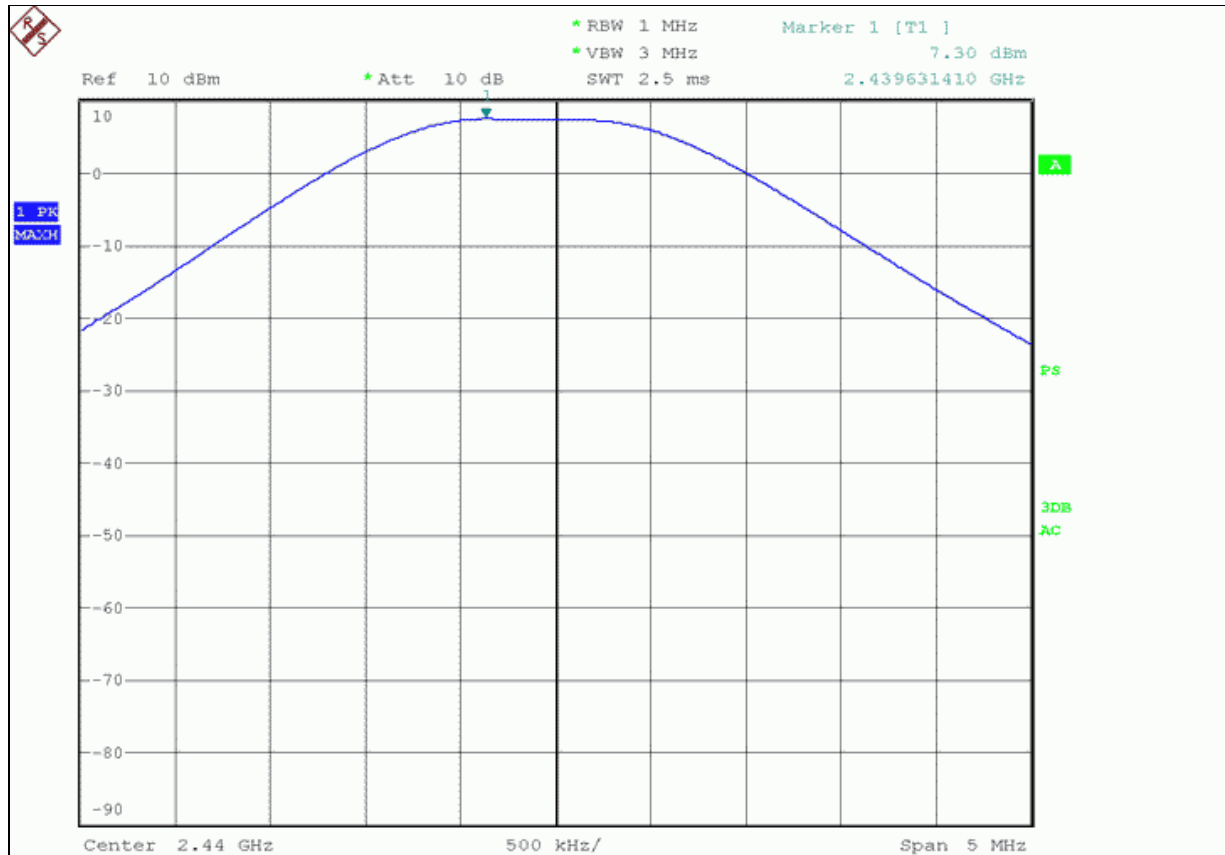
Low channel



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Middle Channel

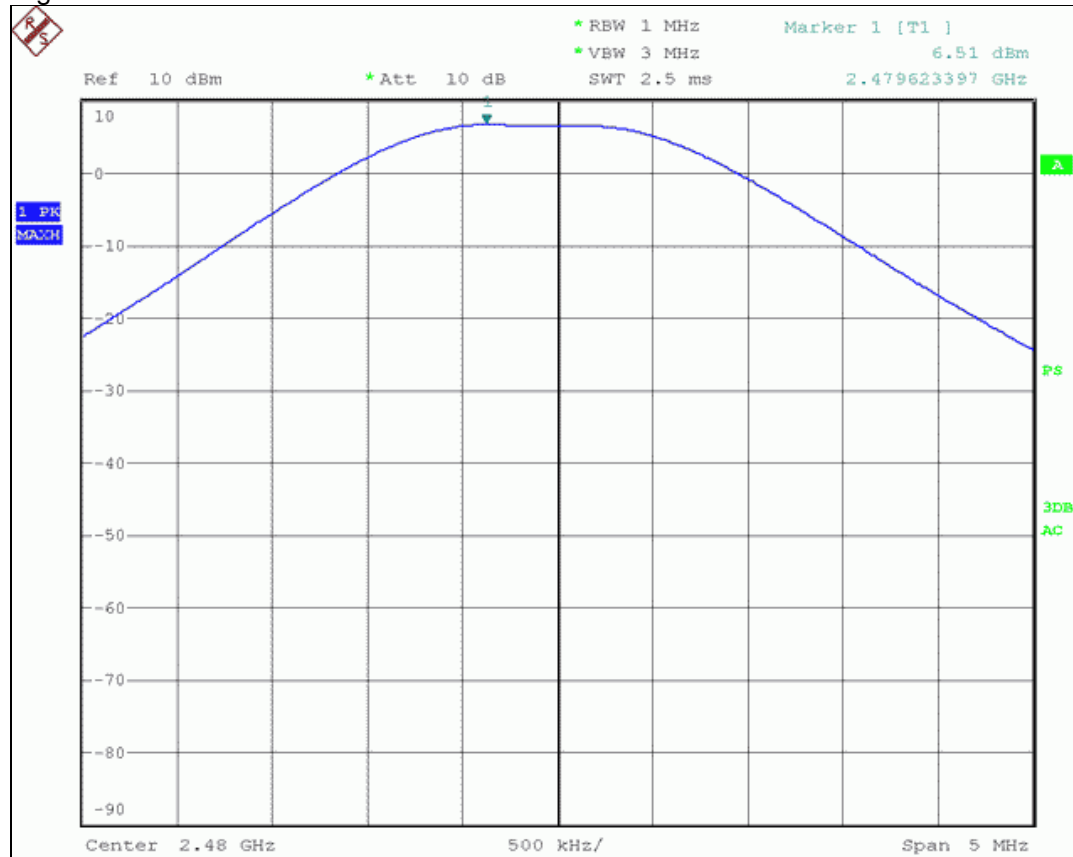


Date: 15.OCT.2013 09:10:52

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High Channel



Date: 15.OCT.2013 09:11:20

5.1.3 6dB Bandwidth

RESULT:

Pass

Date of testing : 2013-10-15
Test standard : FCC Part 15.247(a)(2)
Basic standard : ANSI C63.10: 2009
Kind of test site : Shielded room

Test setup

Test Channel : Low/ Middle/ High
Operation Mode : A1
Ambient temperature : 25°C
Relative humidity : 55%
Atmospheric pressure : 101 kPa

Table 5: Test result of 6dB Bandwidth

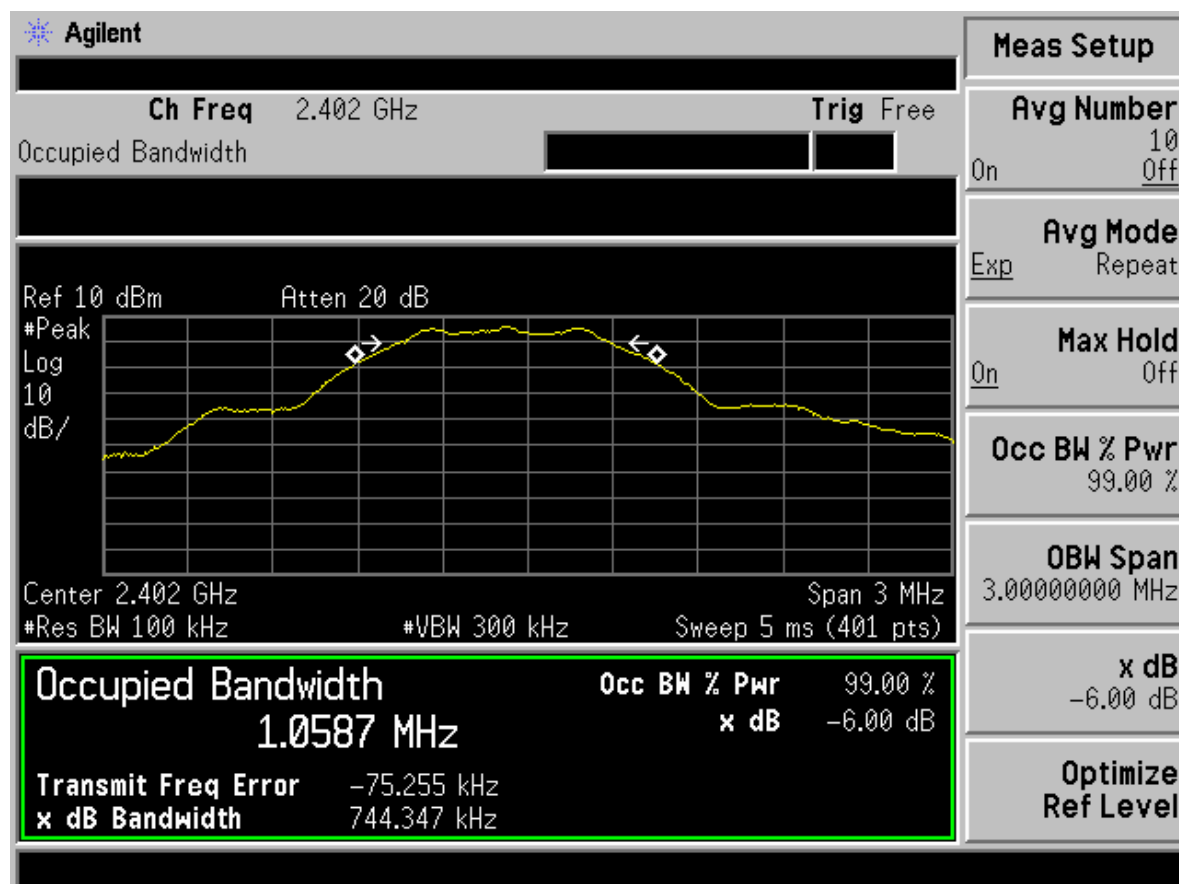
Channel	Channel Frequency (MHz)	6dB Bandwidth (kHz)	Limit (MHz)	Result
Low Channel	2402	744.347	>500	Pass
Mid Channel	2440	756.475	>500	Pass
High Channel	2480	750.234	>500	Pass

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Test Plot of 6dB Bandwidth

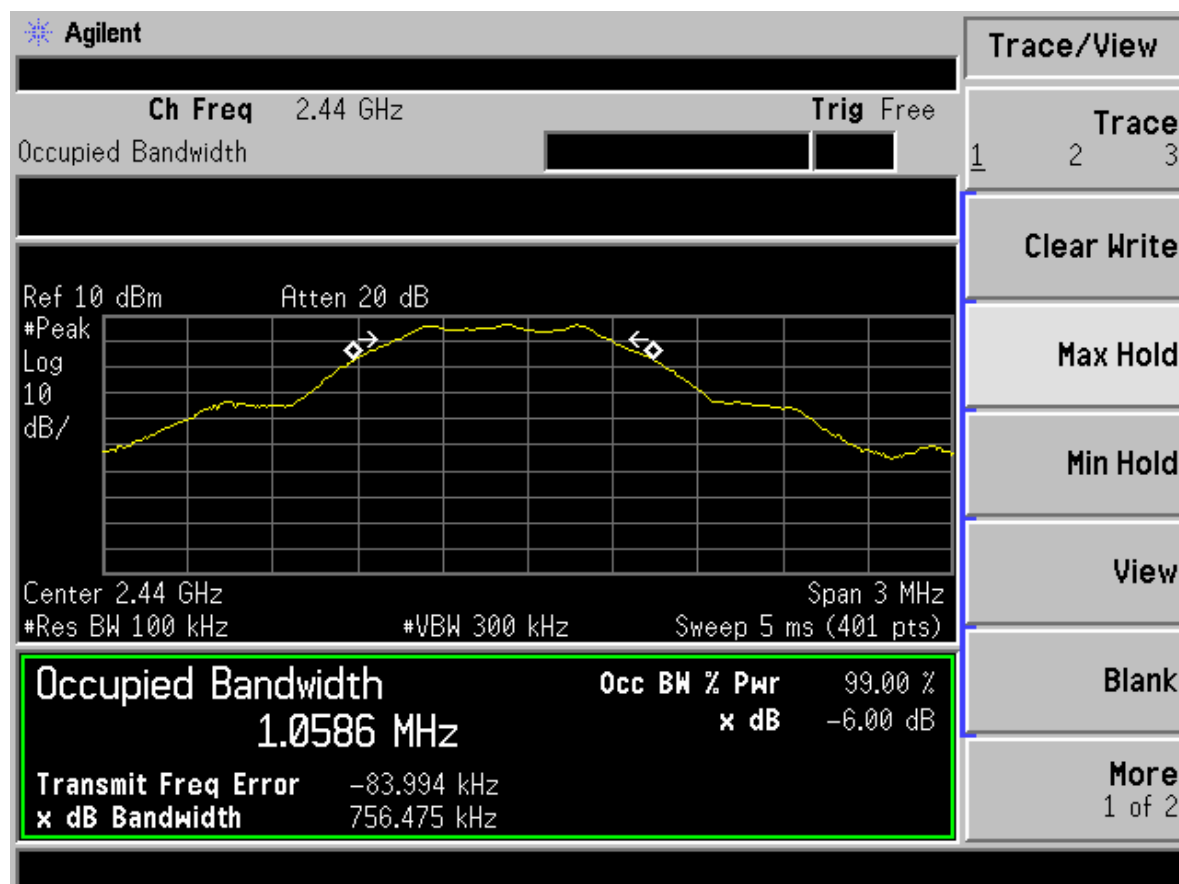
Low channel



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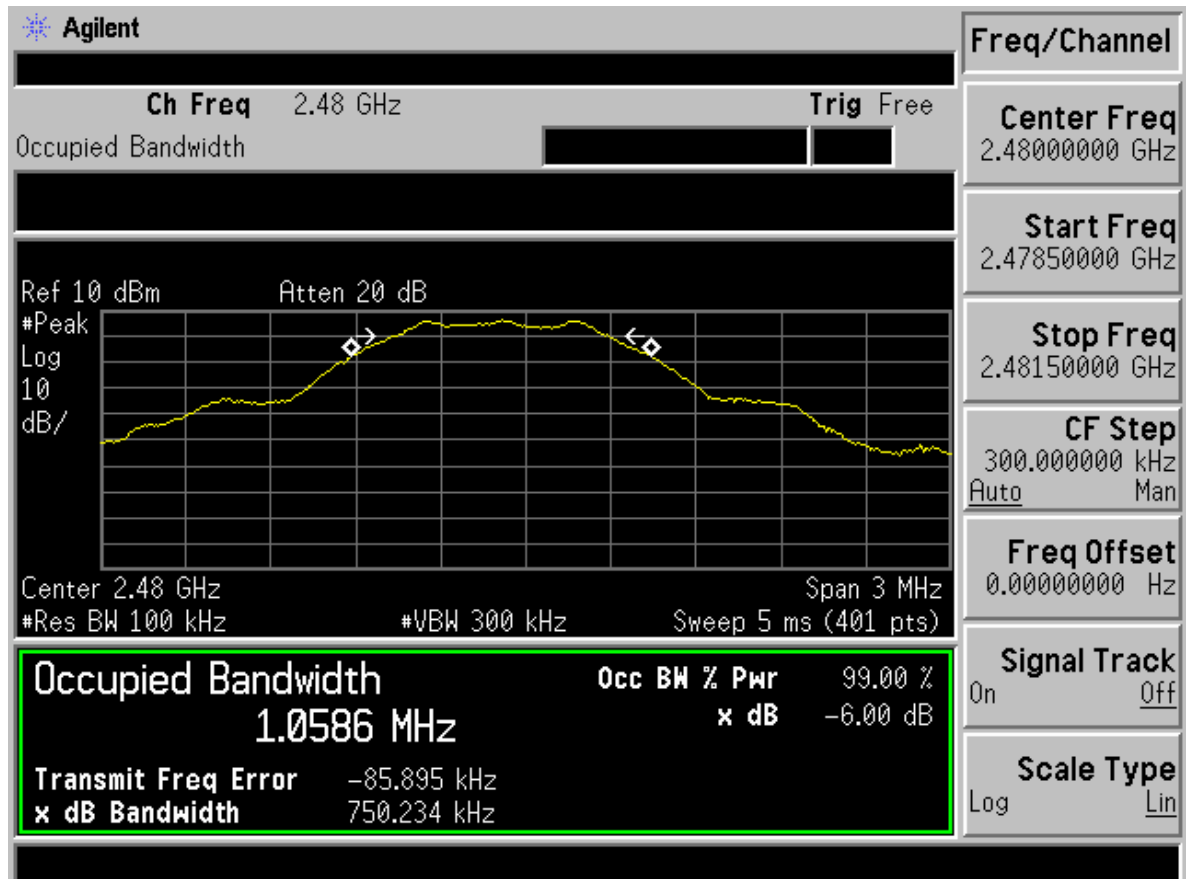
Middle channel



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High channel



5.1.4 Power Density

RESULT:

Pass

Date of testing : 2013-10-15
Test standard : FCC Part 15.247(e)
Basic standard : ANSI C63.10: 2009
Limits : 8dBm/3kHz
Kind of test site : Shielded room

Test setup

Test Channel : Low/ Middle/ High
Operation mode : A1
Ambient temperature : 25°C
Relative humidity : 55%
Atmospheric pressure : 101 kPa

Table 6: Test result of 6dB Bandwidth

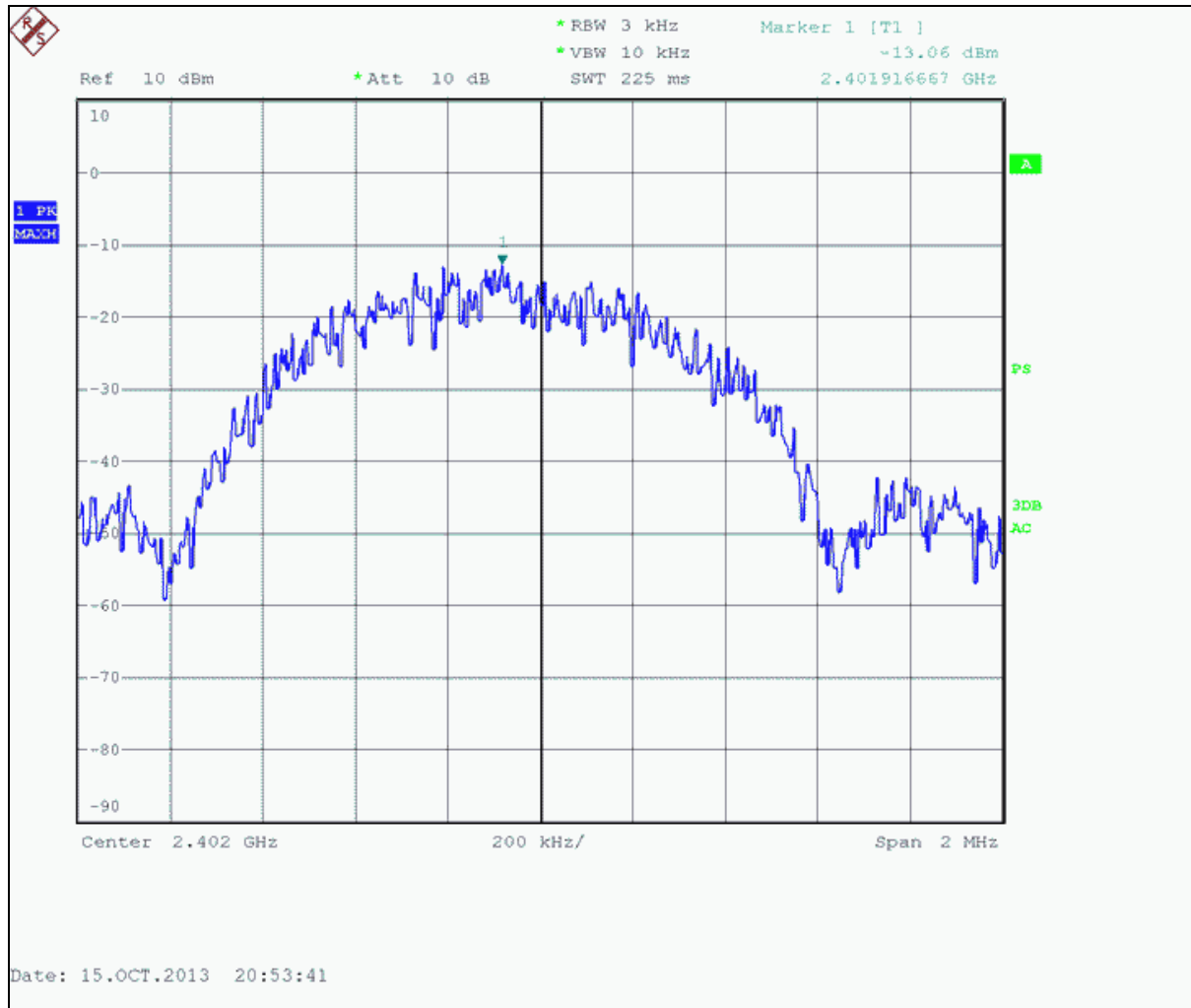
Channel	Channel Frequency (MHz)	Peak Power Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Low Channel	2402	-13.06	8	Pass
Mid Channel	2440	-13.09	8	Pass
High Channel	2480	-13.33	8	Pass

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Test Plot of Power Density

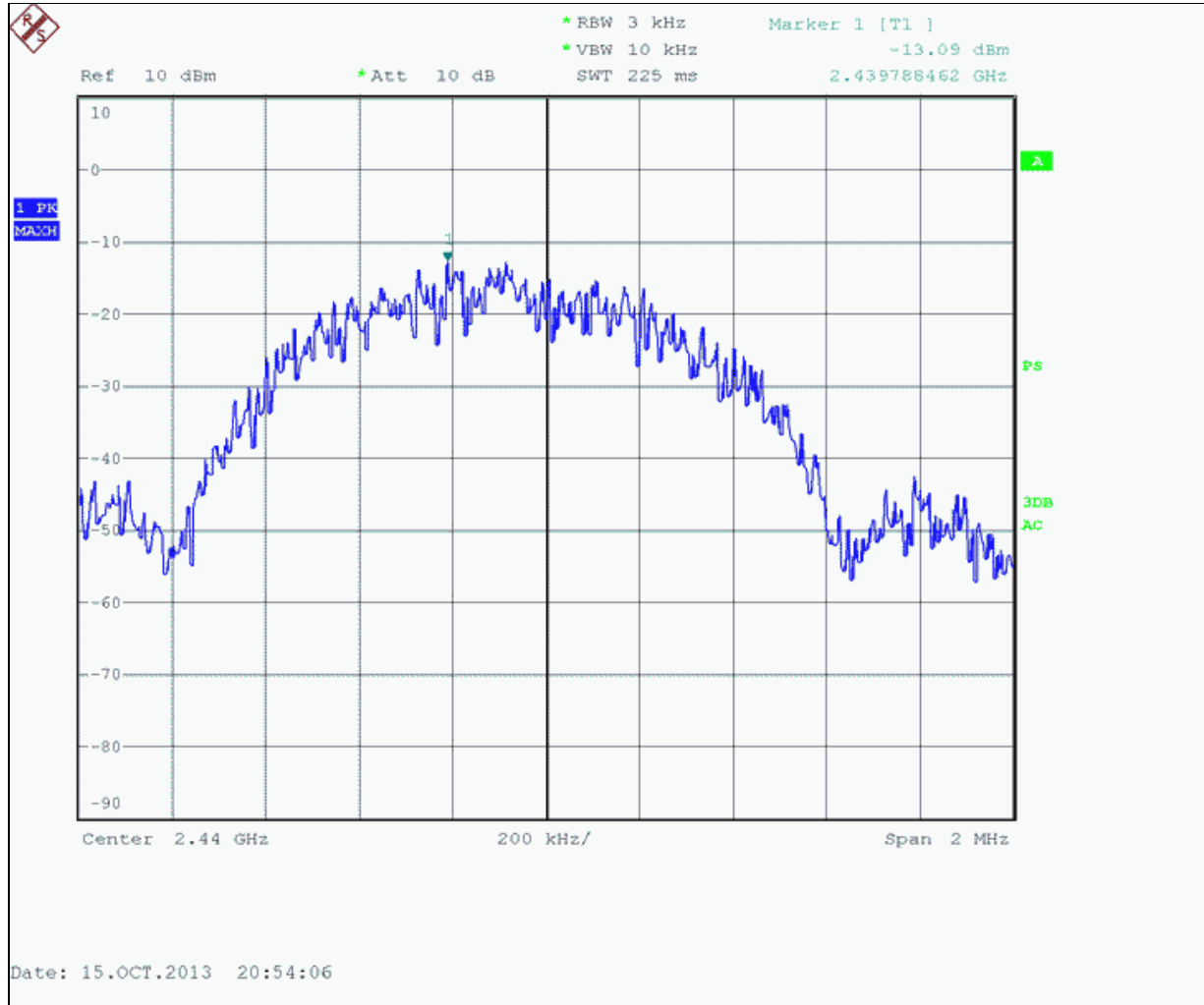
Low channel



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Middle channel



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High channel



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5.1.5 Conducted Spurious Emissions Measured in 100kHz Bandwidth

RESULT:

Pass

Date of testing	:	2013-11-05
Test standard	:	FCC Part 15.247(d)
Basic standard	:	ANSI C63.10: 2009
Limit	:	20dB (below that in the 100kHz bandwidth within the band that contains the highest level of the desired power); In addition, radiated emissions which fall in the restricted bands, must also comply with the radiated emission limits specified in 15.209(a)
Kind of test site	:	Shield room

Test setup

Test Channel	:	Low/Middle/ High
Operation mode	:	A1
Ambient temperature	:	25°C
Relative humidity	:	55%
Atmospheric pressure	:	101 kPa

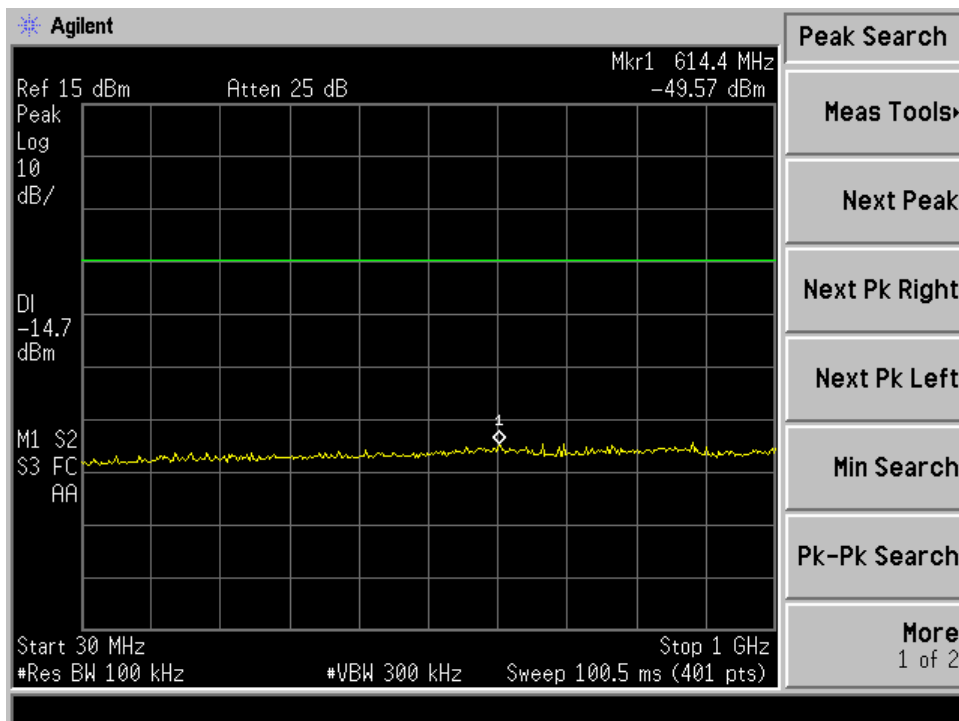
For details refer to following test plots.

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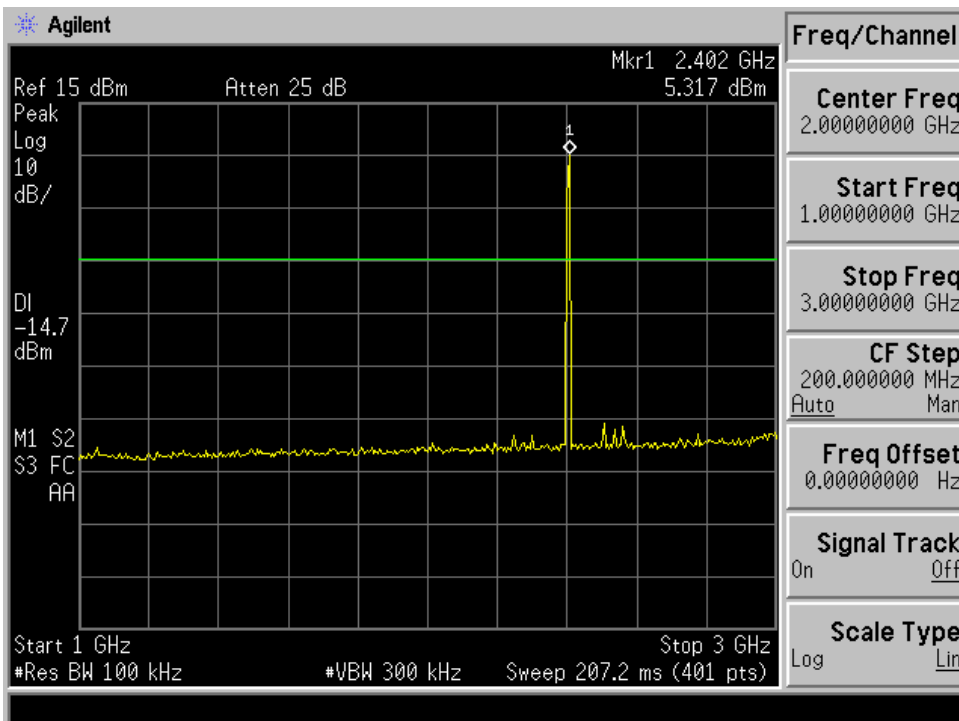
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Test Plot of 100 kHz Conducted Spurious Emissions

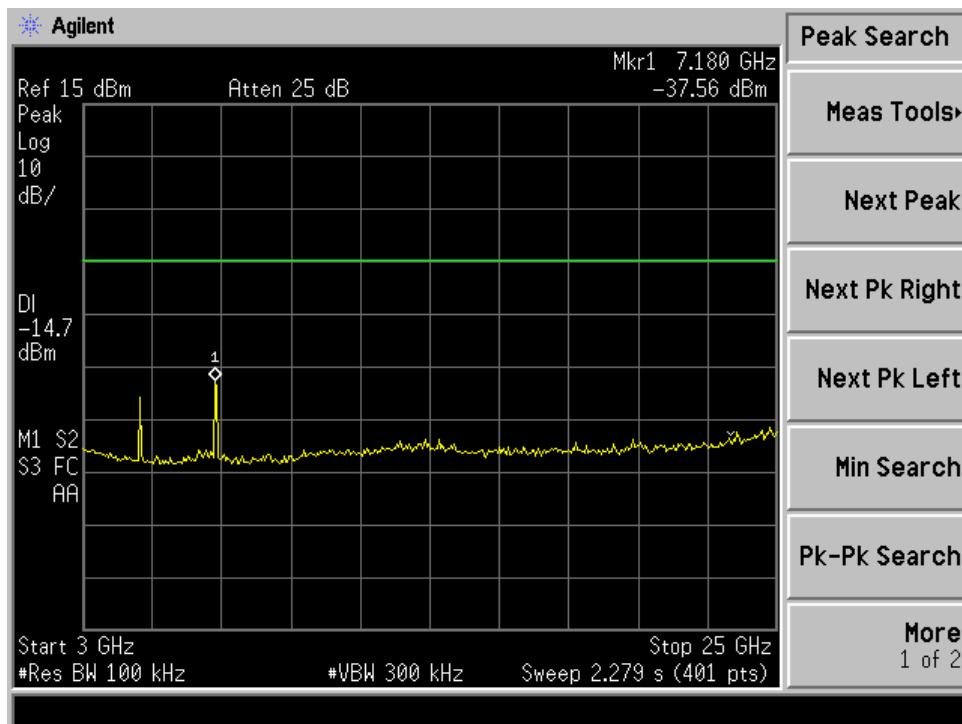
Low Channel, 30M-1GHz



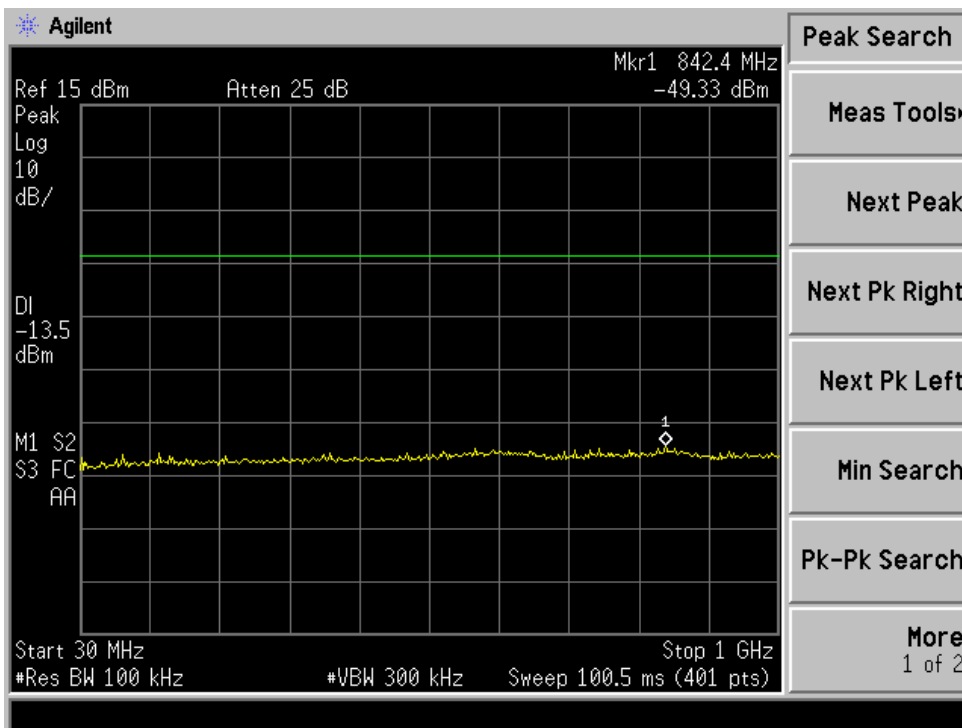
Low Channel, 1GHz-3GHz



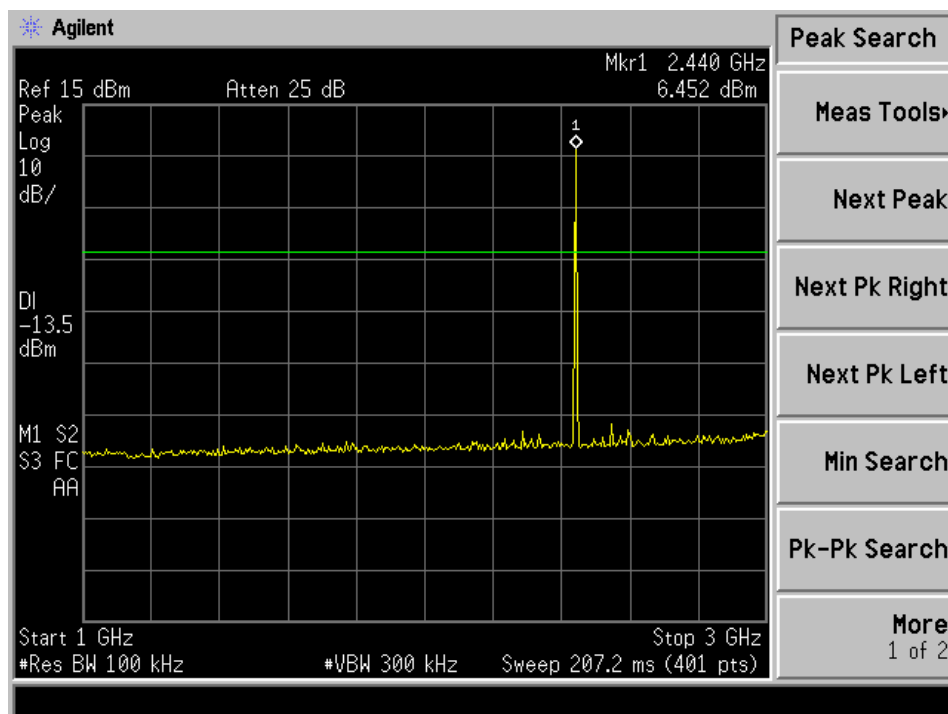
Low Channel, 3GHz-25GHz



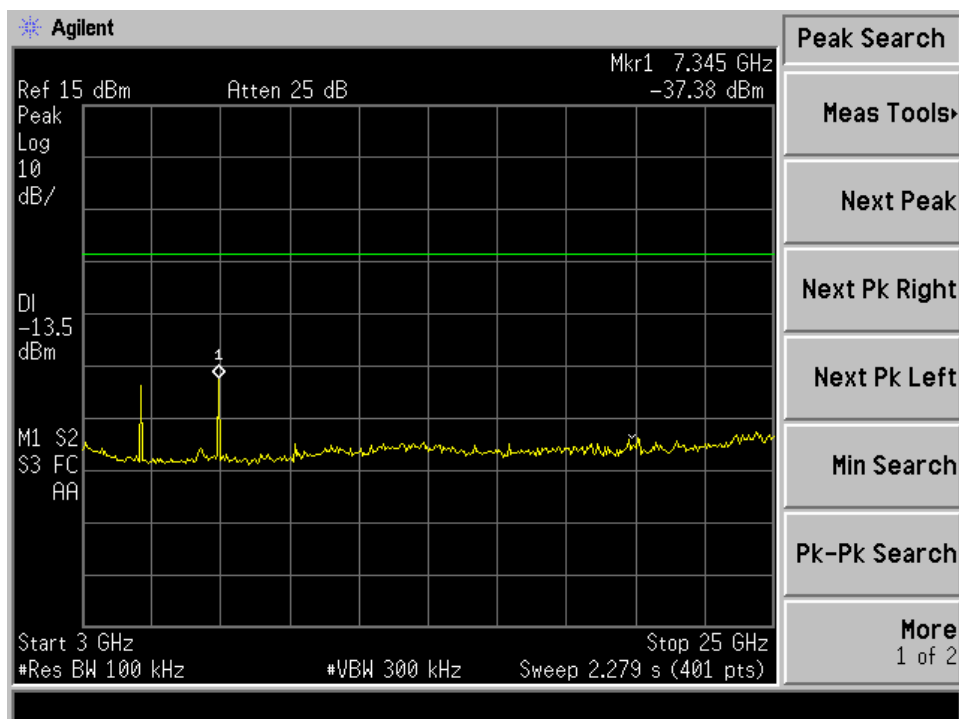
Middle Channel, 30MHz-1GHz



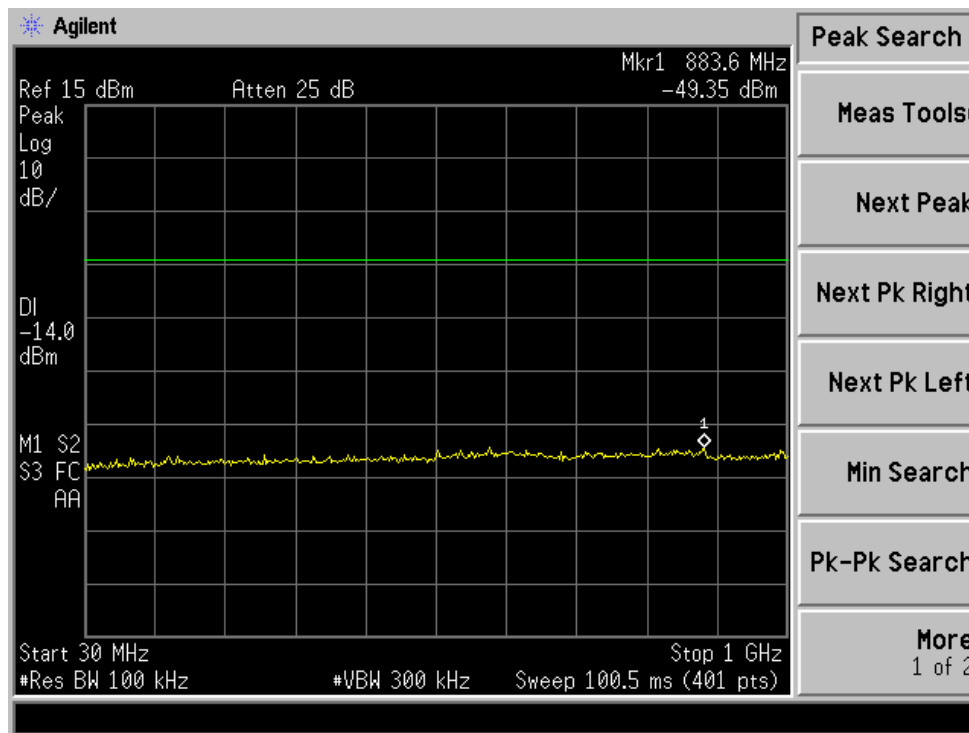
Middle Channel, 1GHz-3GHz



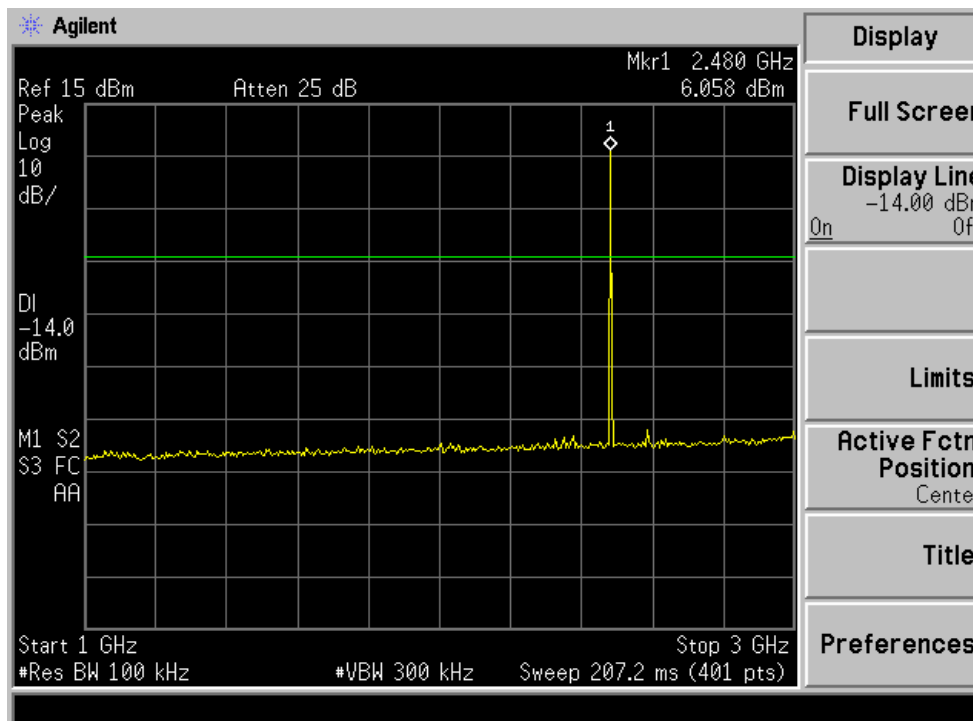
Middle Channel, 3GHz-25GHz



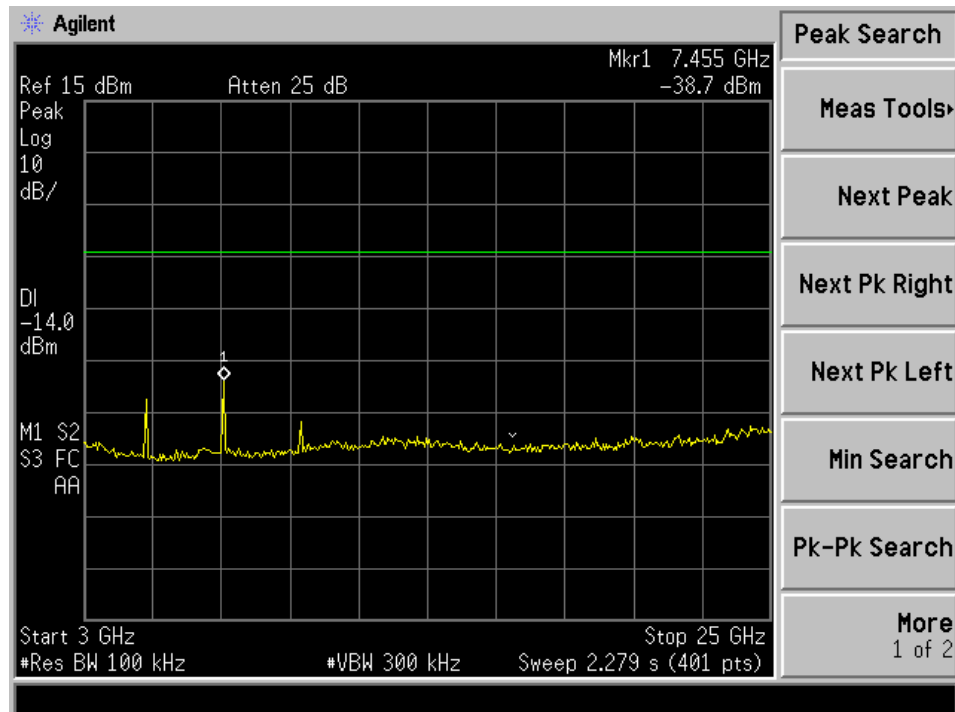
High Channel, 30MHz-1GHz



High Channel, 1GHz-3GHz



High Channel, 3GHz-25GHz



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5.1.6 Radiated Spurious Emissions

RESULT:

Pass

Date of testing	:	2013-10-10~2013-11-28
Test standard	:	FCC Part 15.247(d), FCC 15.205, FCC Part 15.209.
Basic standard	:	ANSI C63.10: 2009
Limit	:	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 §15.205(c)).
Kind of test site	:	3m Semi-Anechoic Chamber

Test setup

Input Voltage	:	DC 3.7V from internal lithium battery
Operation mode	:	A1
Earthing	:	Not connected
Ambient temperature	:	24°C
Relative humidity	:	53%
Atmospheric pressure	:	101 kPa

For details refer to the test plots.

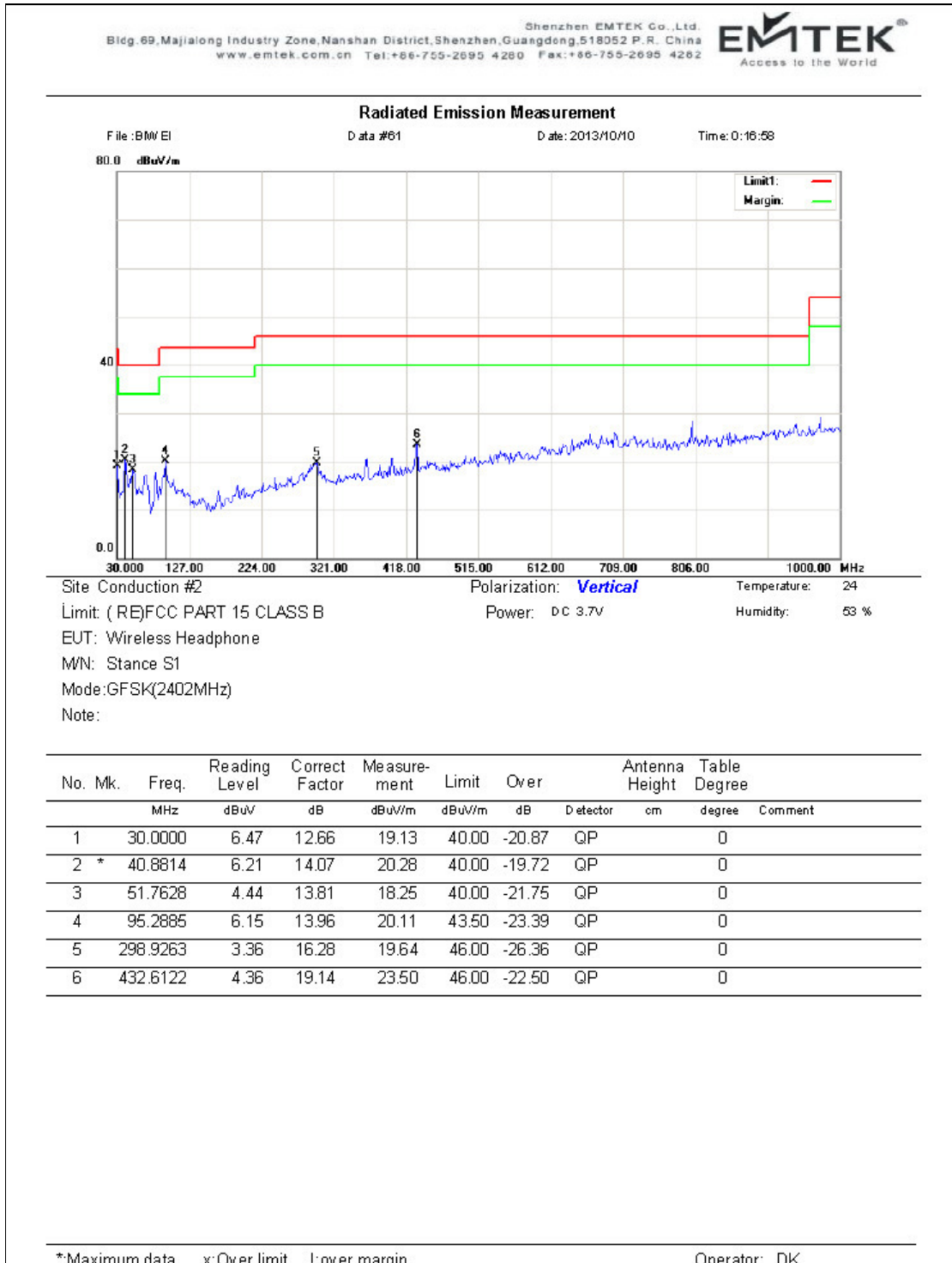
Due to the small size of the product and that there are no inductive components of significant size, 9 kHz to 30MHz frequency range is not tested based on technical judgment.

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Test Plot of Radiated Spurious Emission

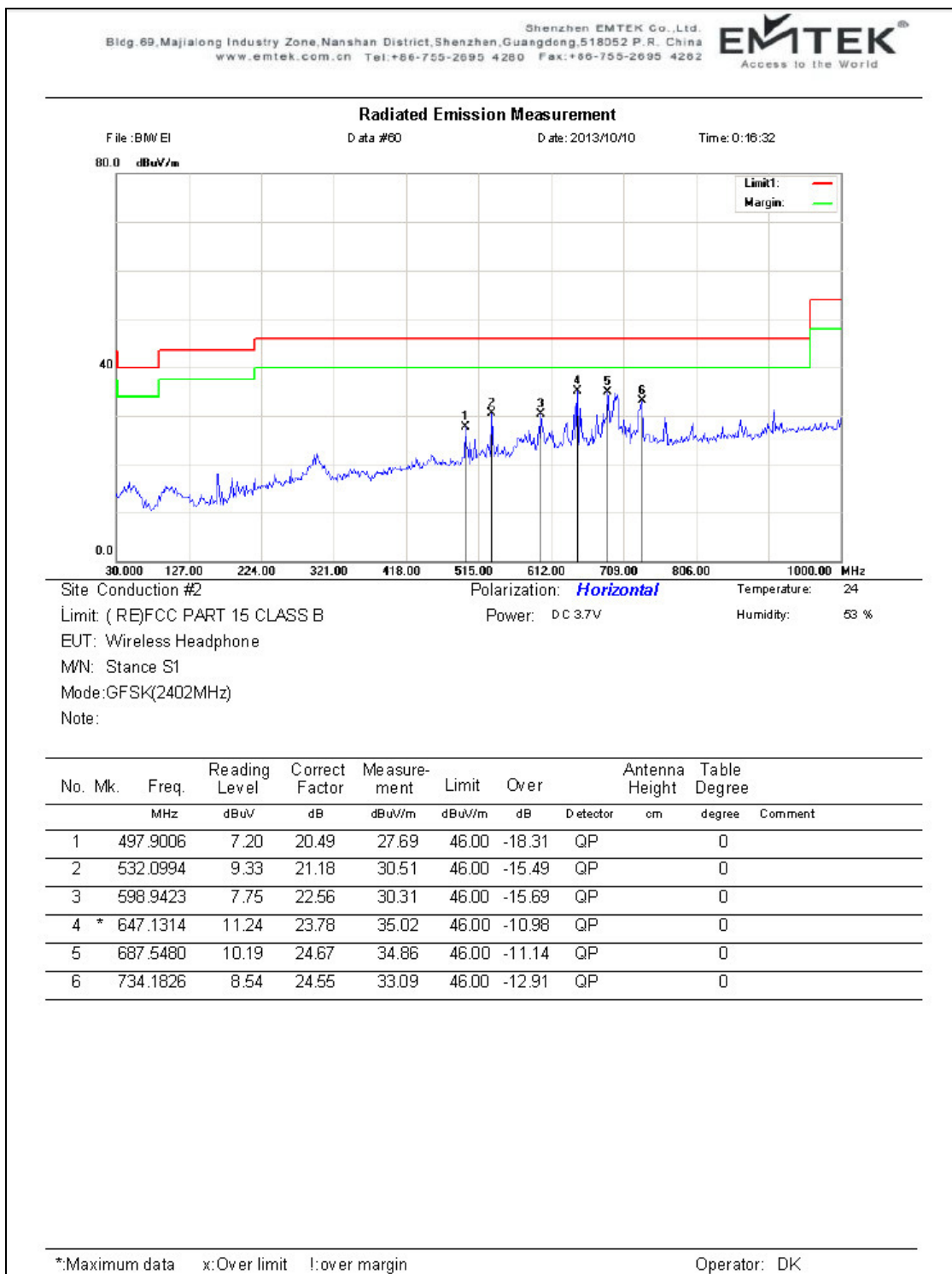
Low channel, 30MHz-1000MHz, vertical polarization



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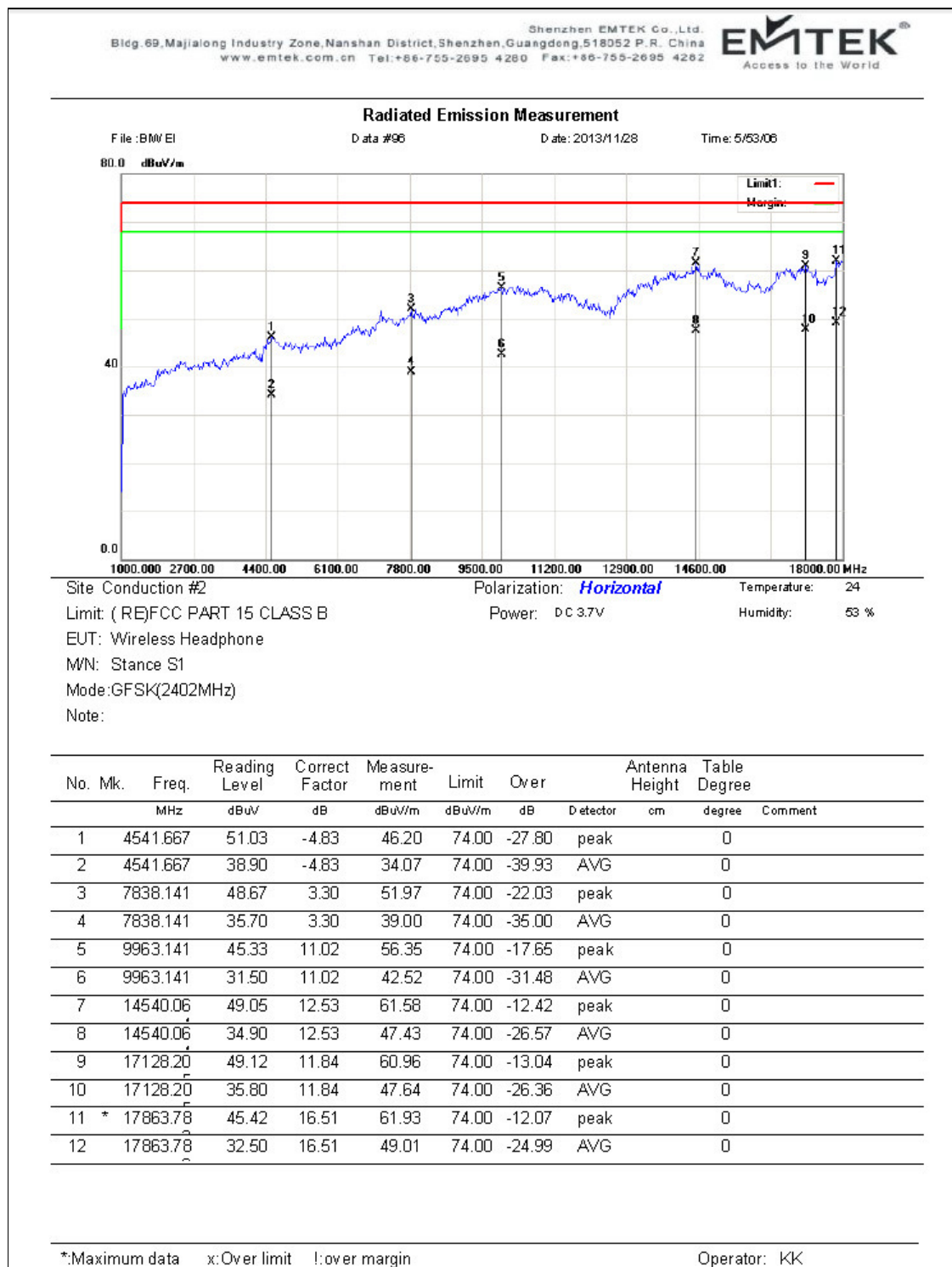
Low channel, 30MHz-1000MHz, horizontal polarization



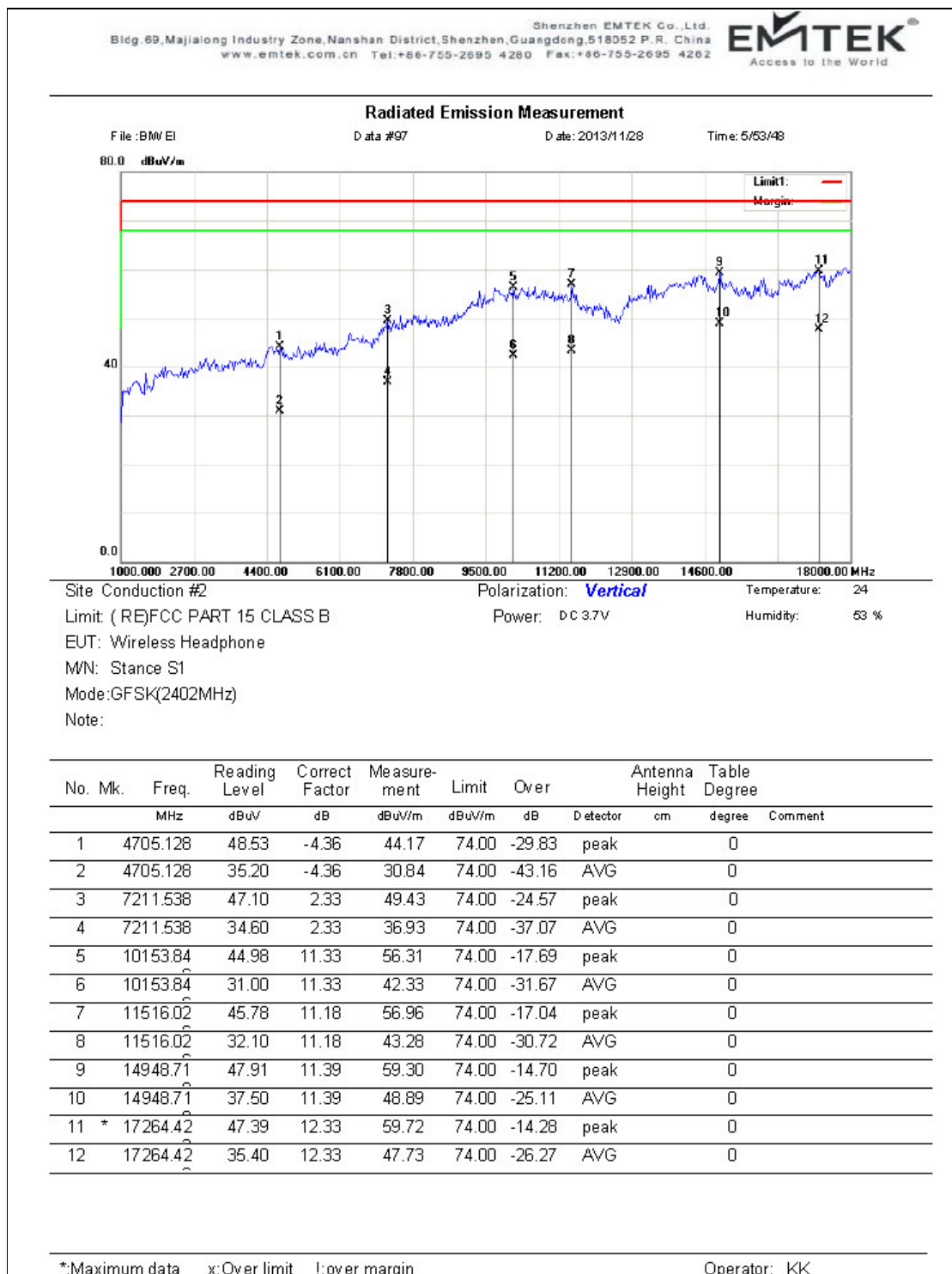
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Low channel, 1000MHz-18000MHz, horizontal polarization



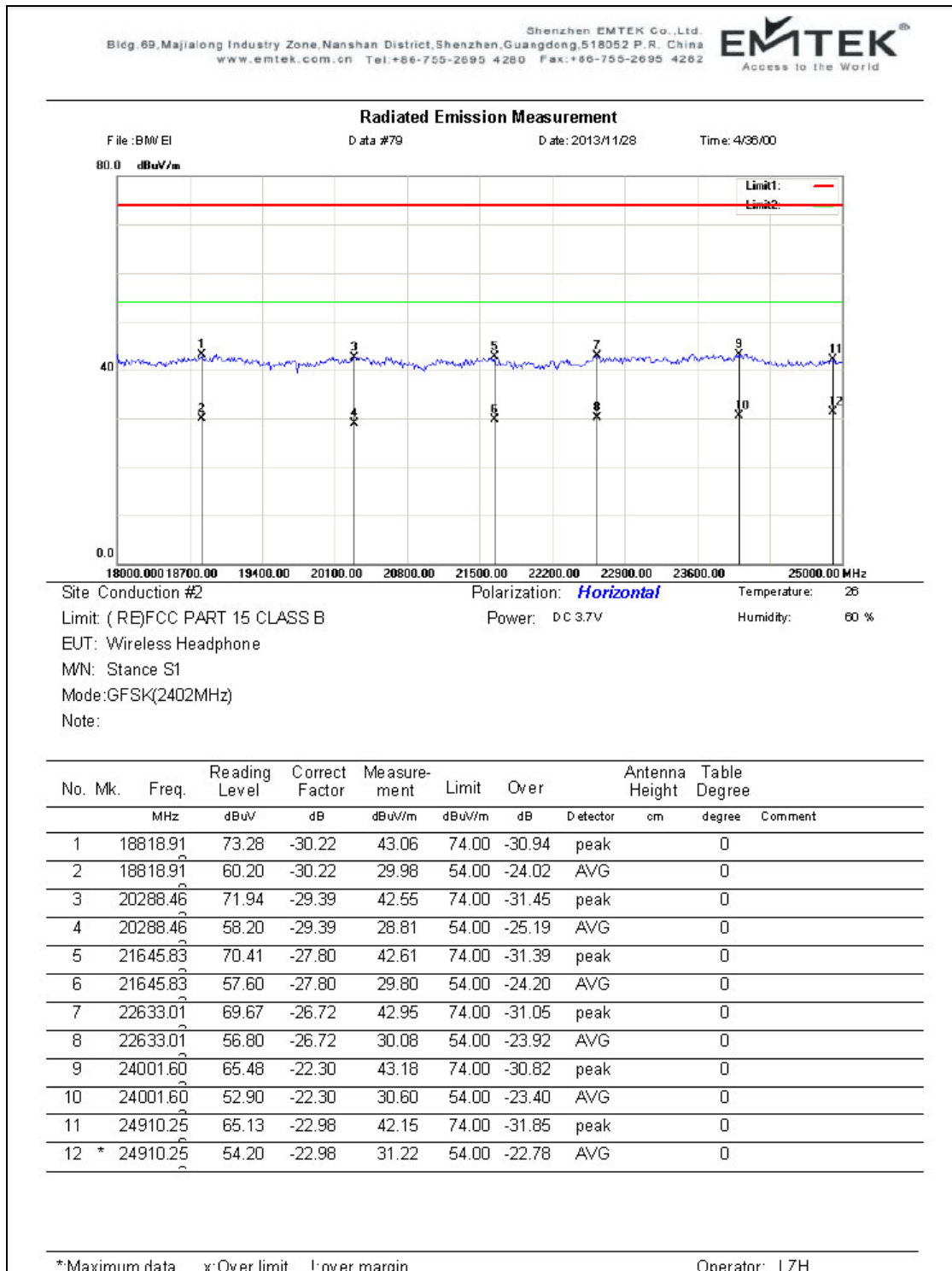
Low channel, 1000MHz-18000MHz, vertical polarization



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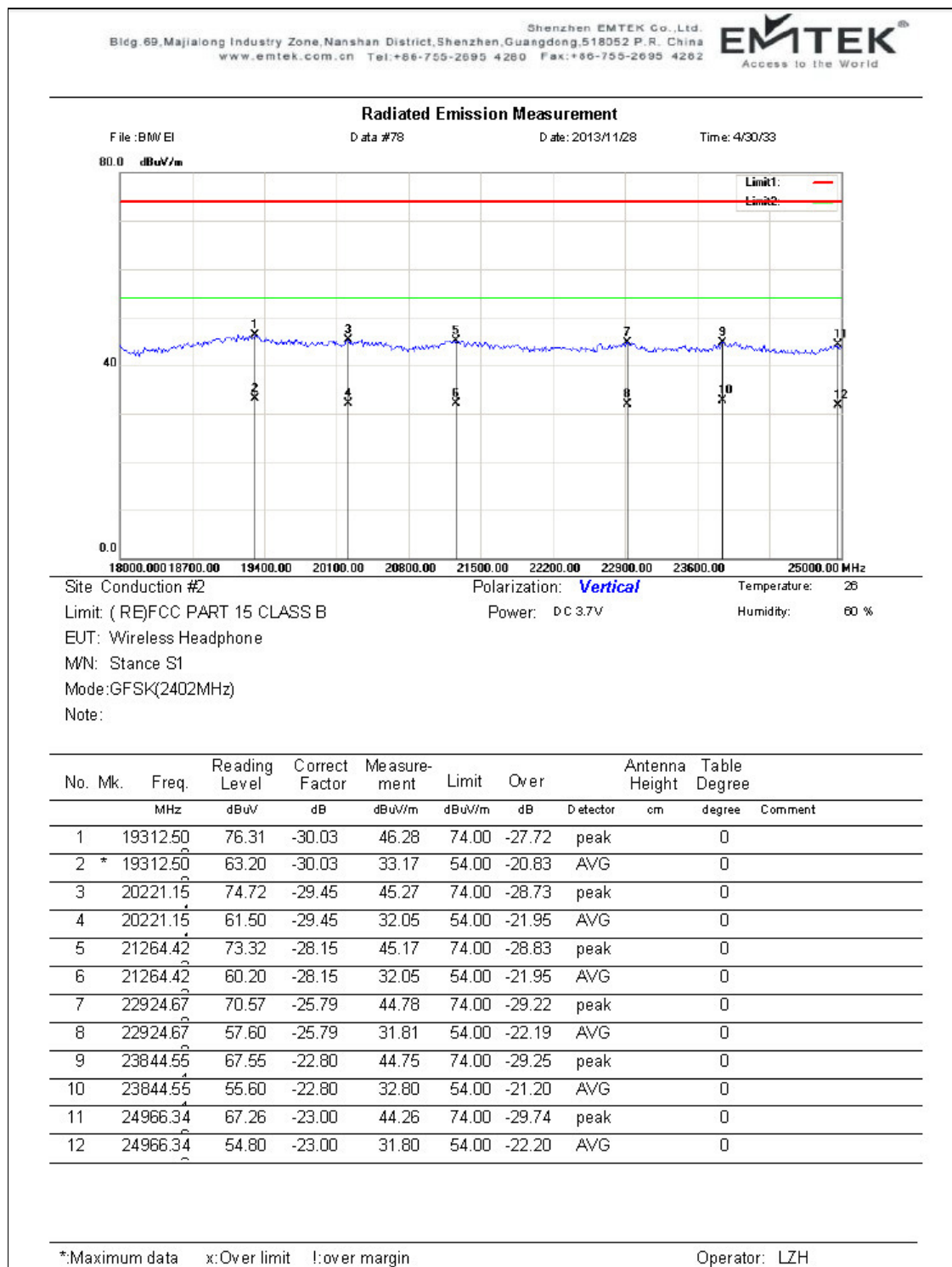
Low channel, 18000MHz-25000MHz, horizontal polarization



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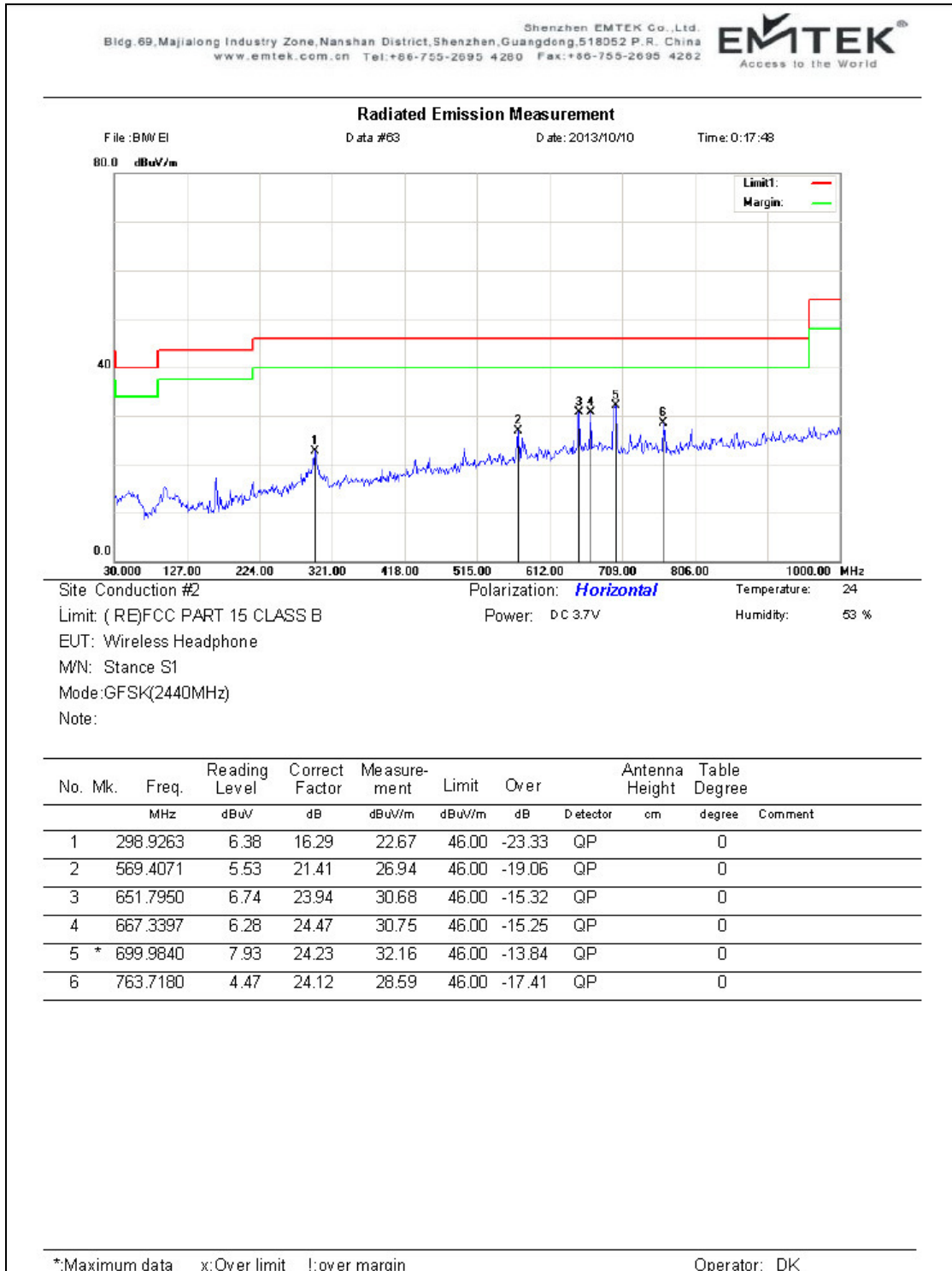
Low channel, 18000MHz-25000MHz, vertical polarization



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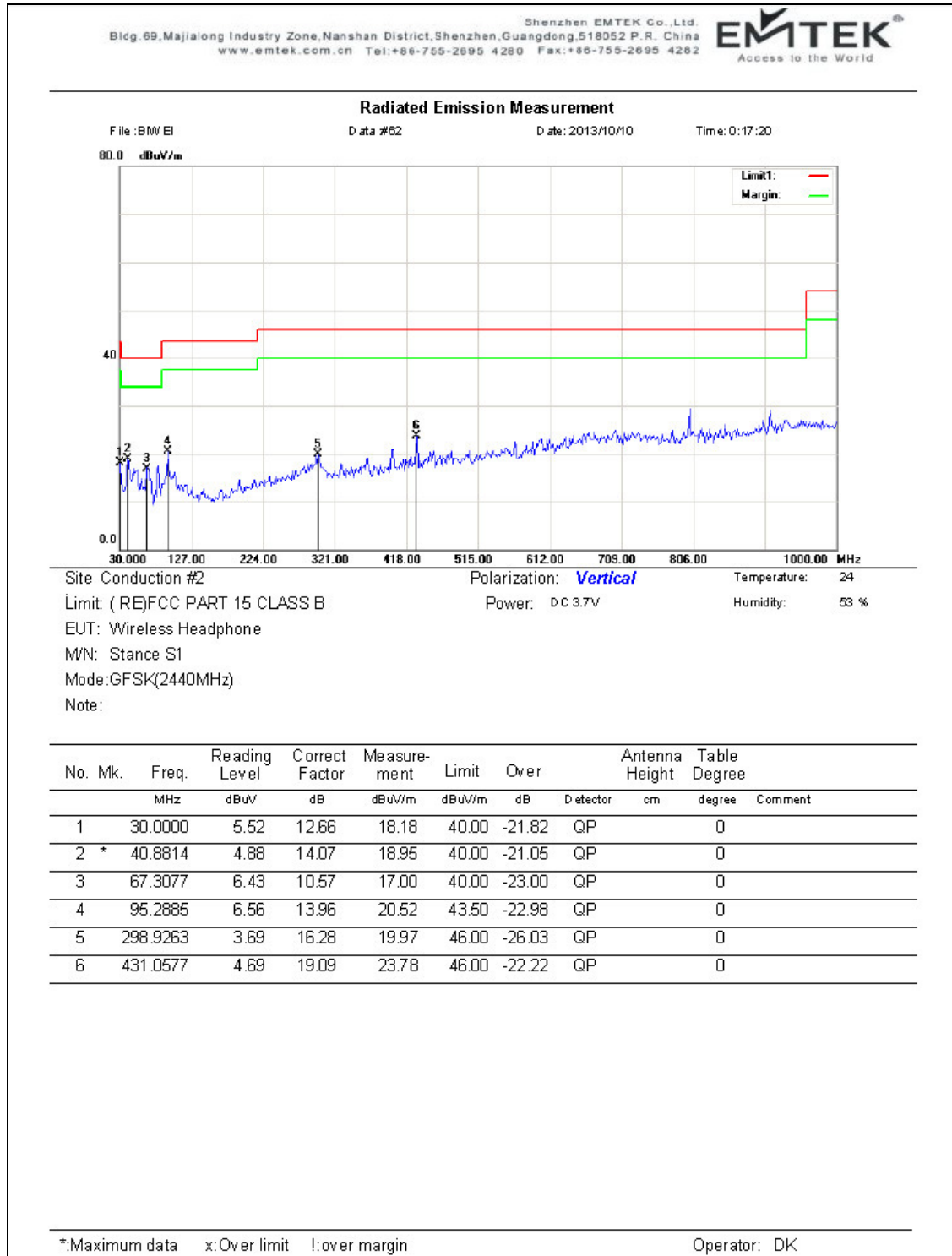
Middle channel, 30MHz-1000MHz, horizontal polarization



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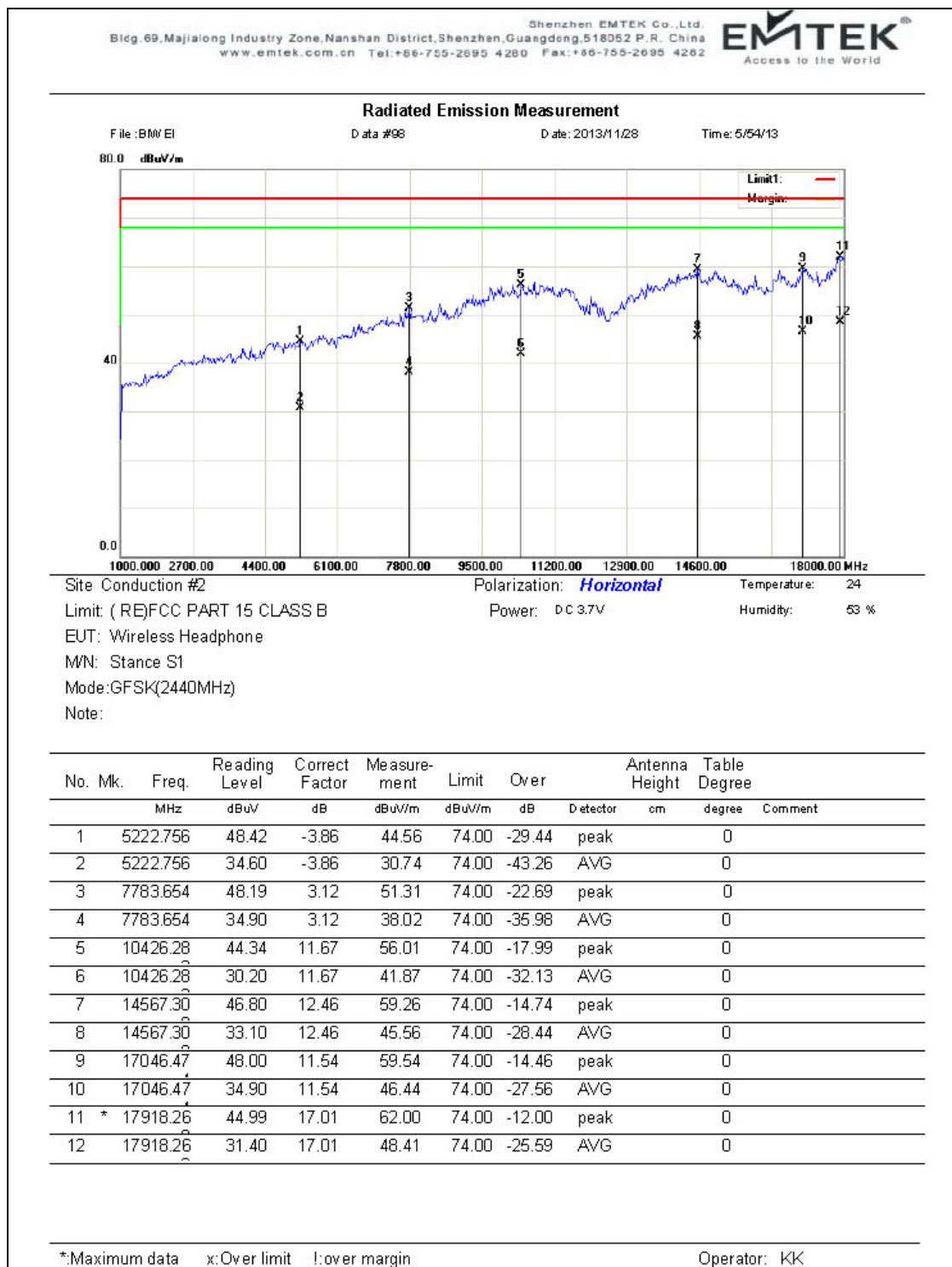
Middle channel, 30MHz-1000MHz, vertical polarization



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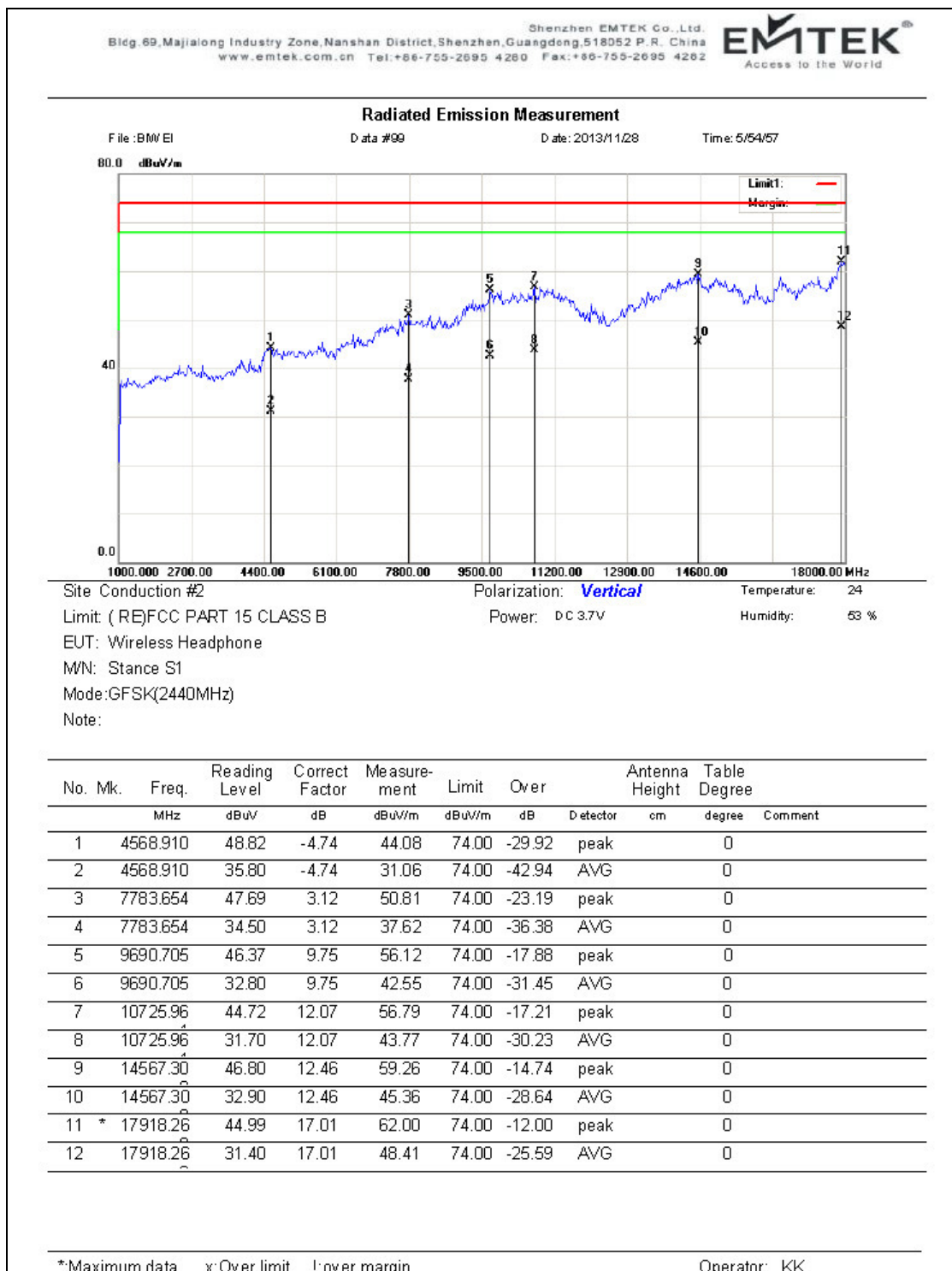
Middle channel, 1000MHz-18000MHz, horizontal polarization



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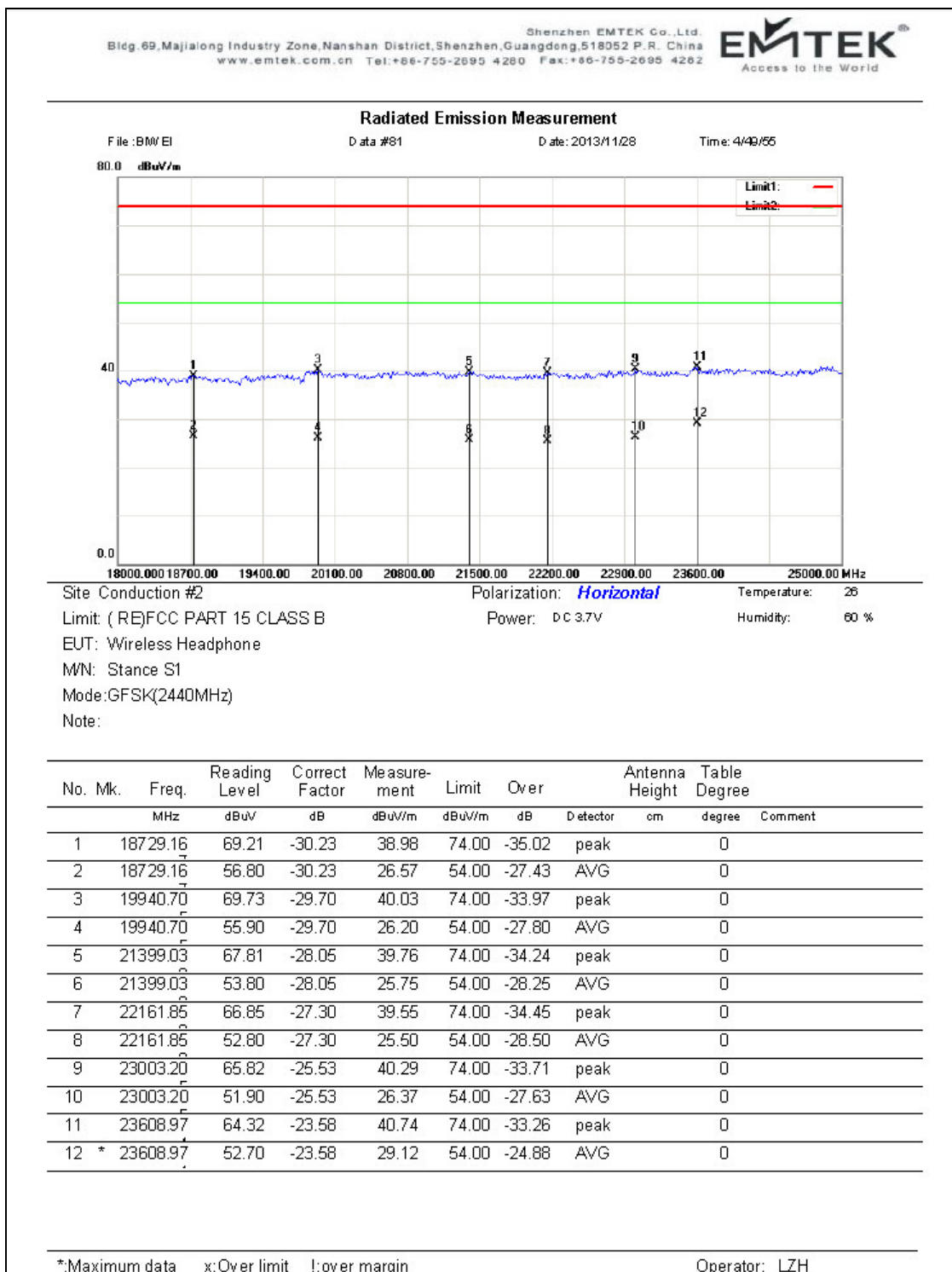
Middle channel, 1000MHz-18000MHz, vertical polarization



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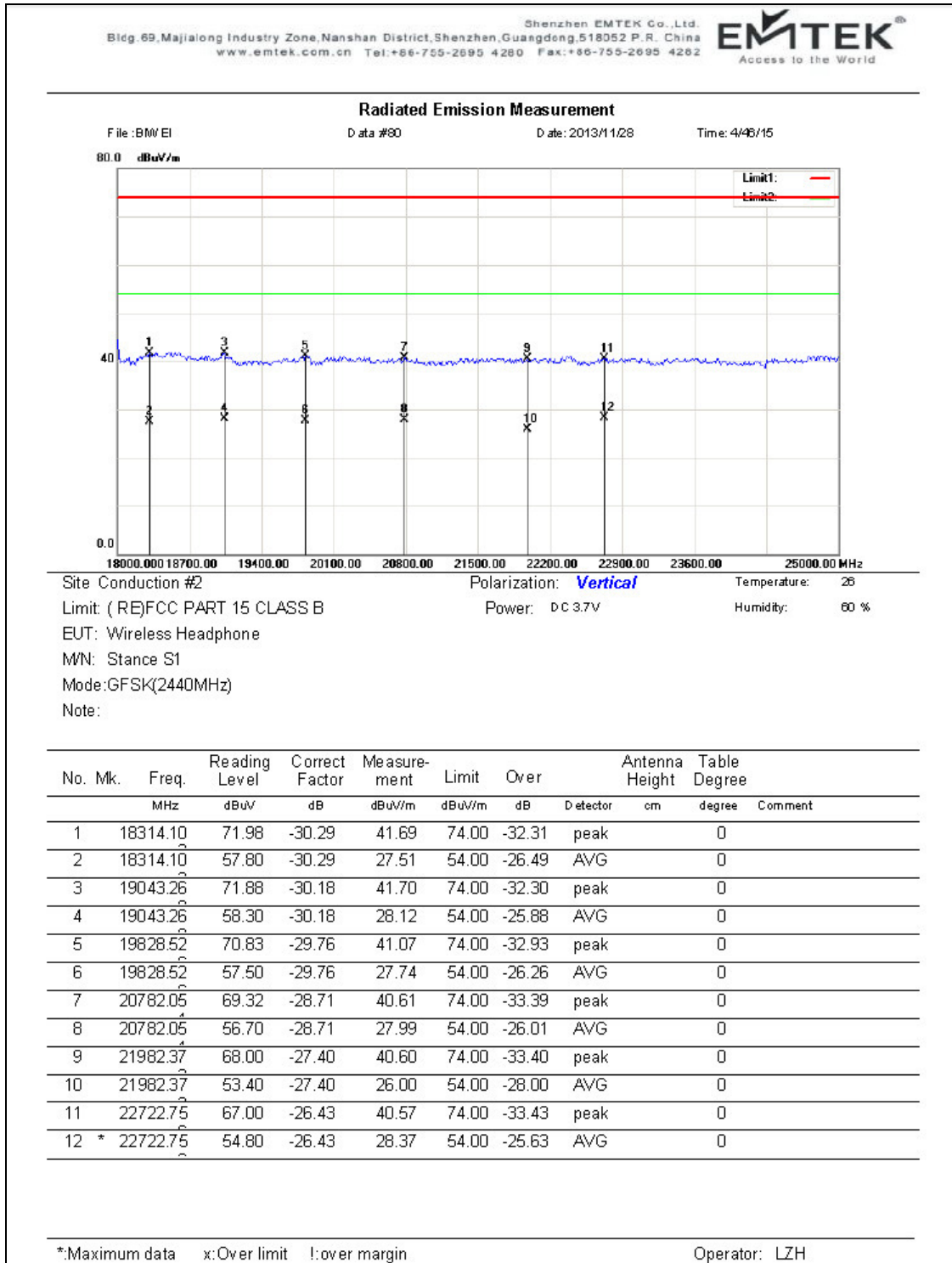
Middle channel, 18000MHz-25000MHz, horizontal polarization



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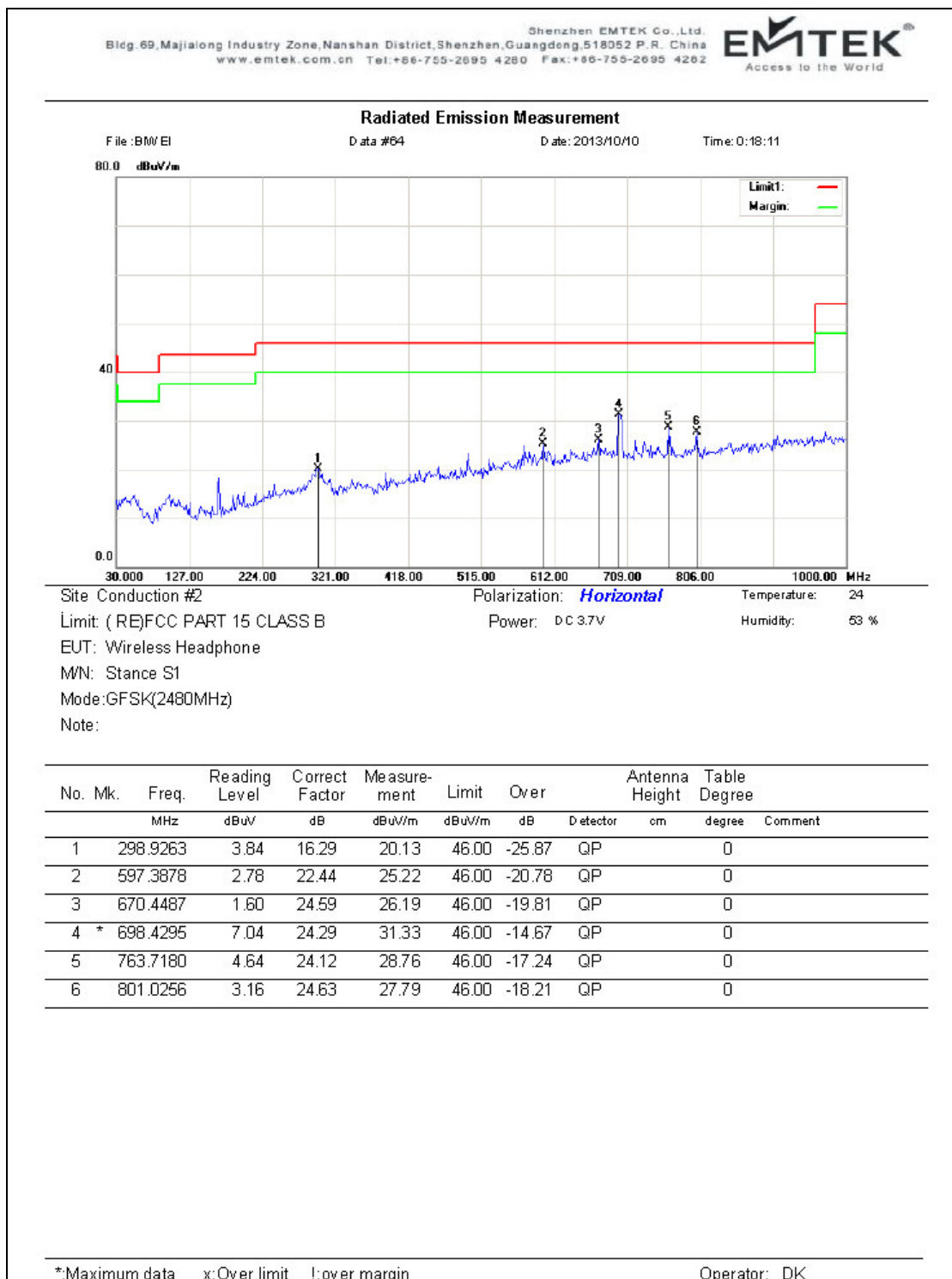
Middle channel, 18000MHz-25000MHz, vertical polarization



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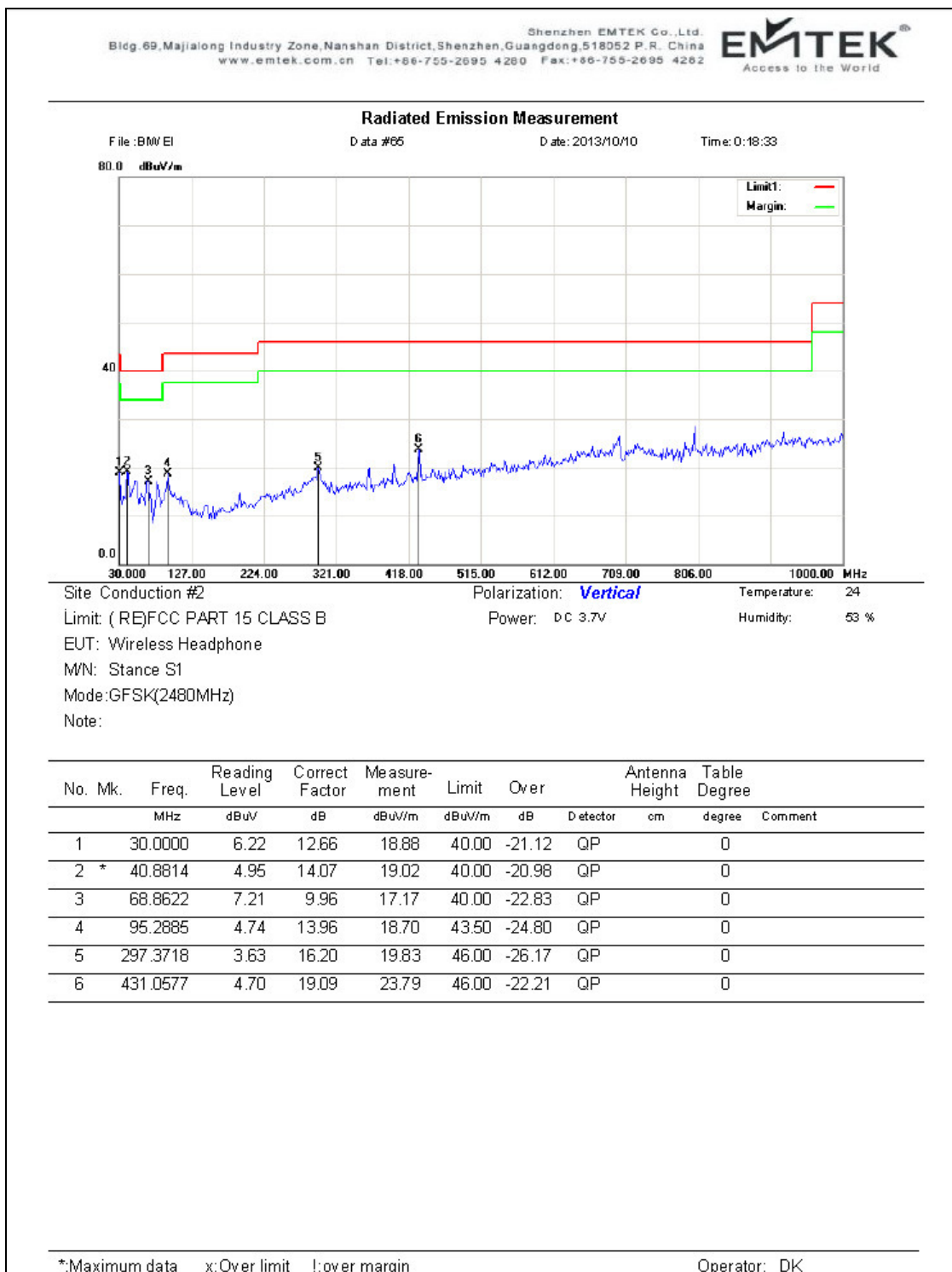
High channel, 30MHz-1000MHz, horizontal polarization



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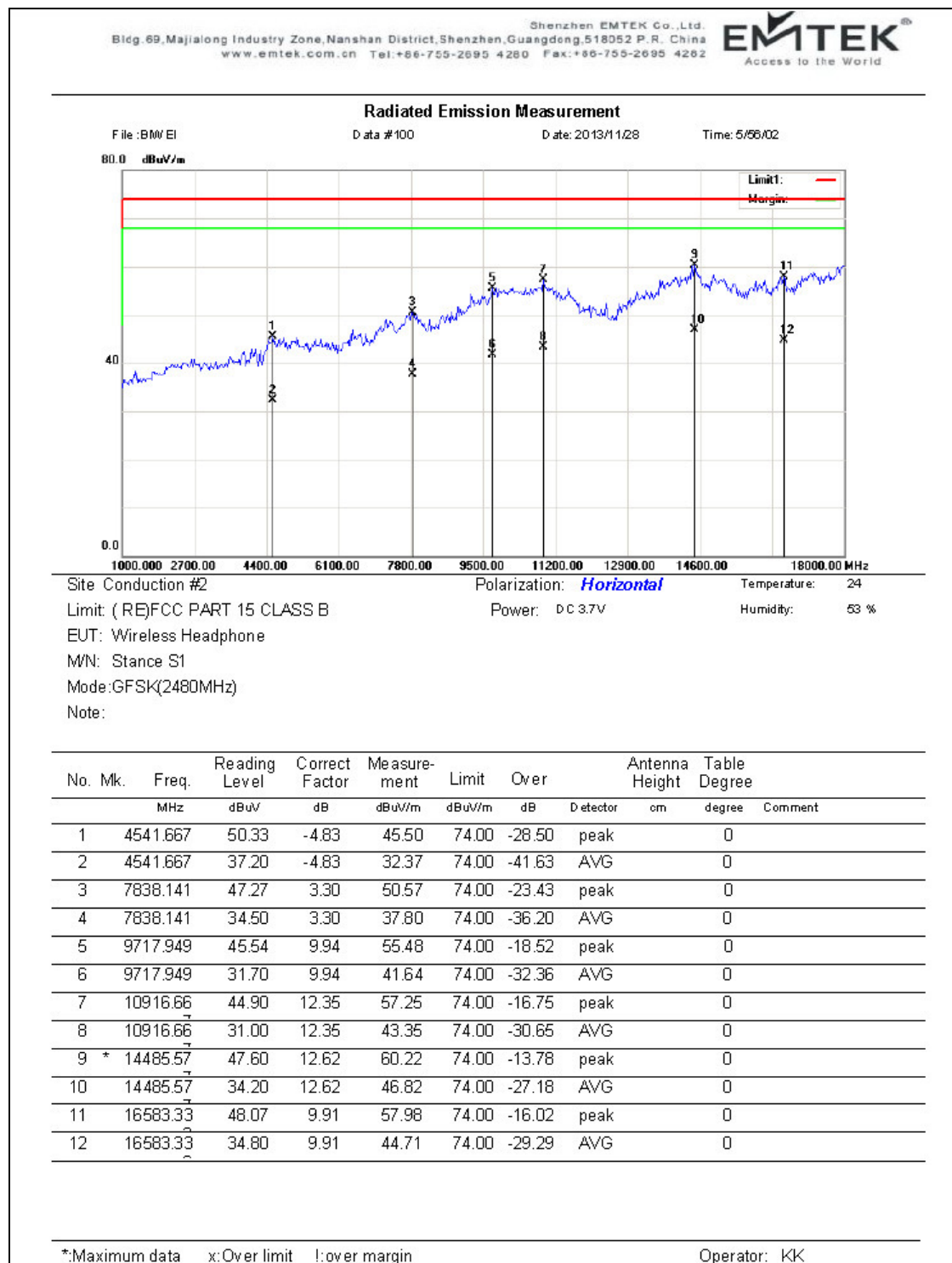
High channel, 30MHz-1000MHz, vertical polarization



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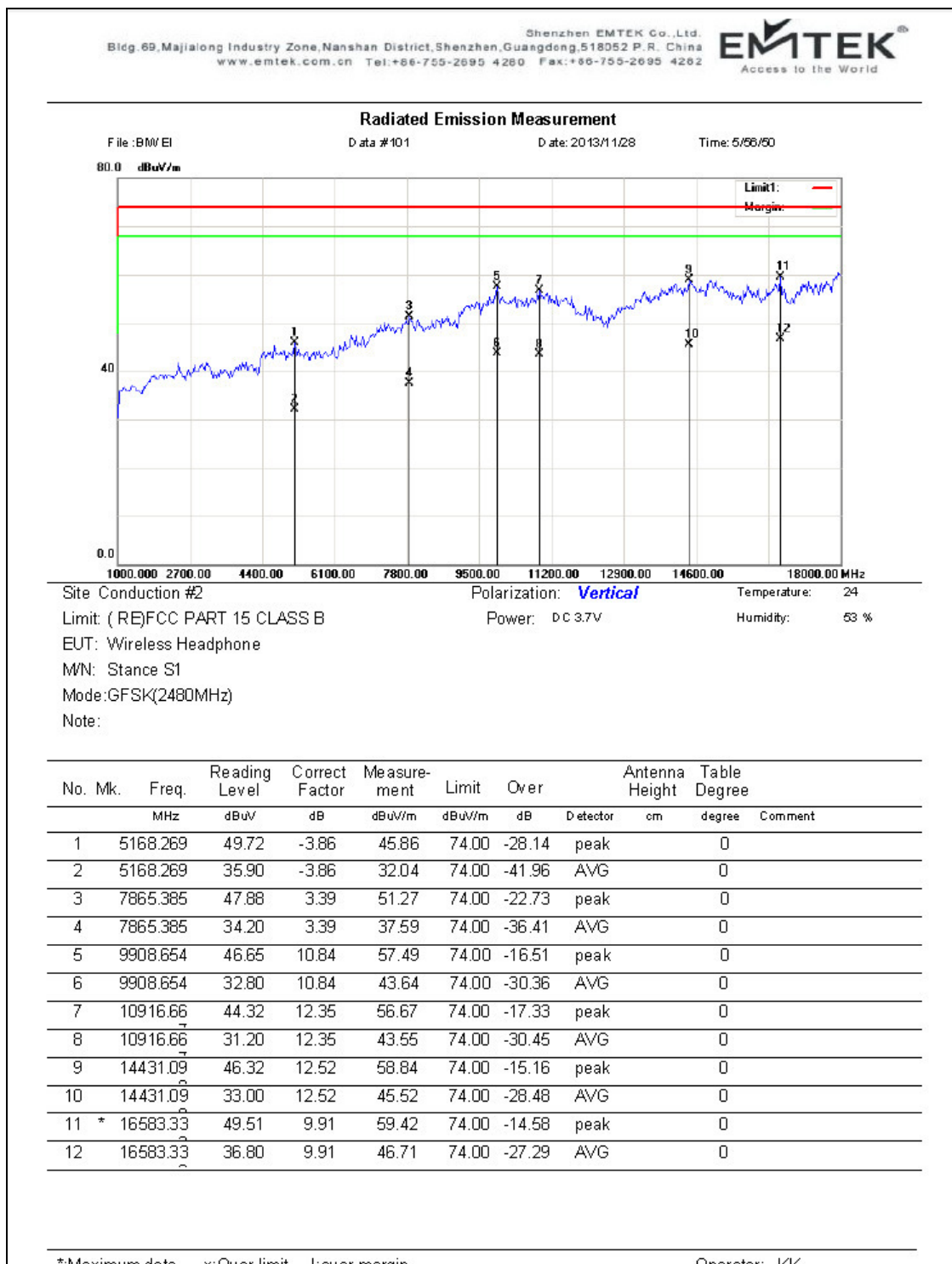
High channel, 1000MHz-18000MHz, horizontal polarization



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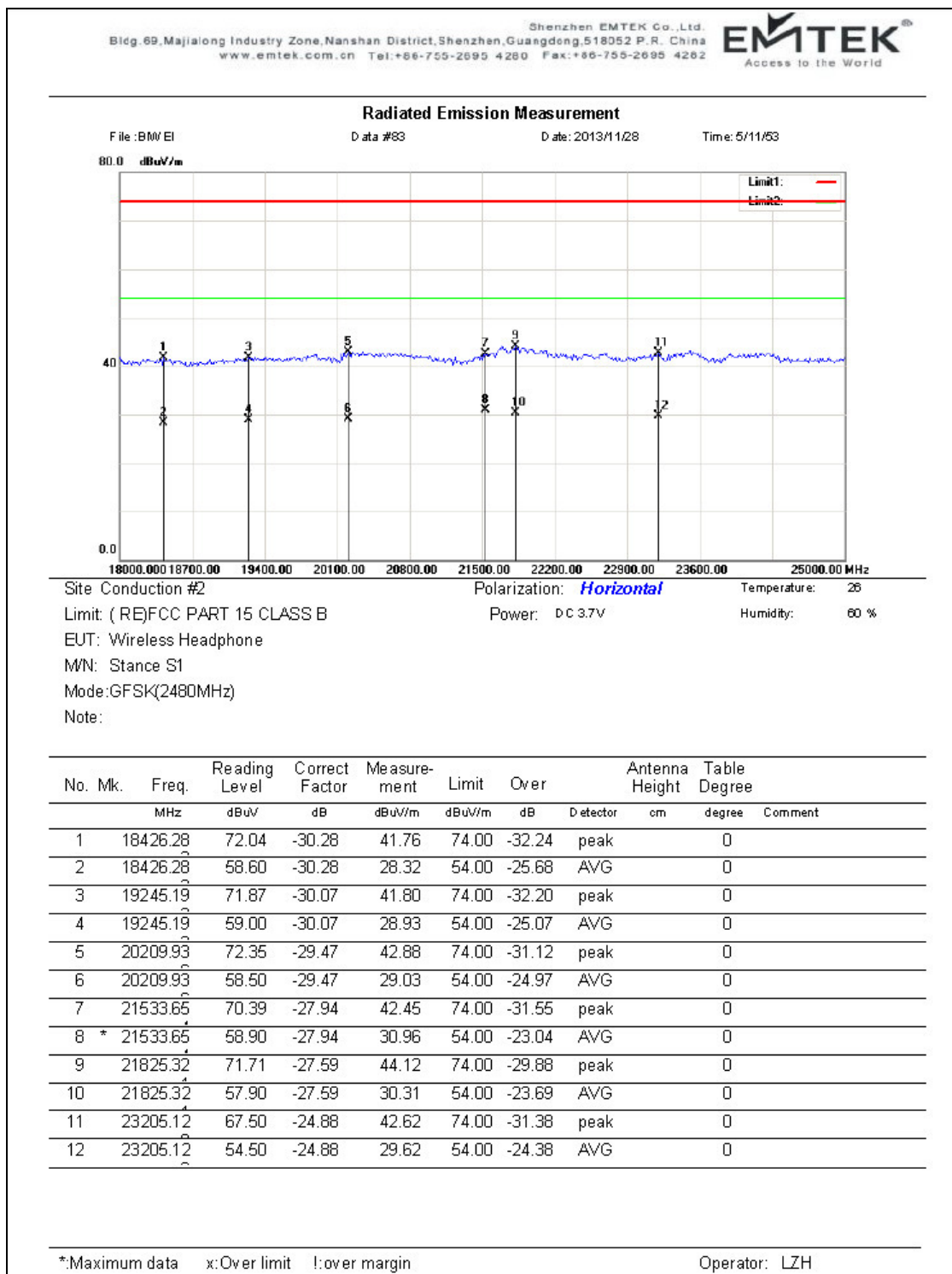
High channel, 1000MHz-18000MHz, vertical polarization



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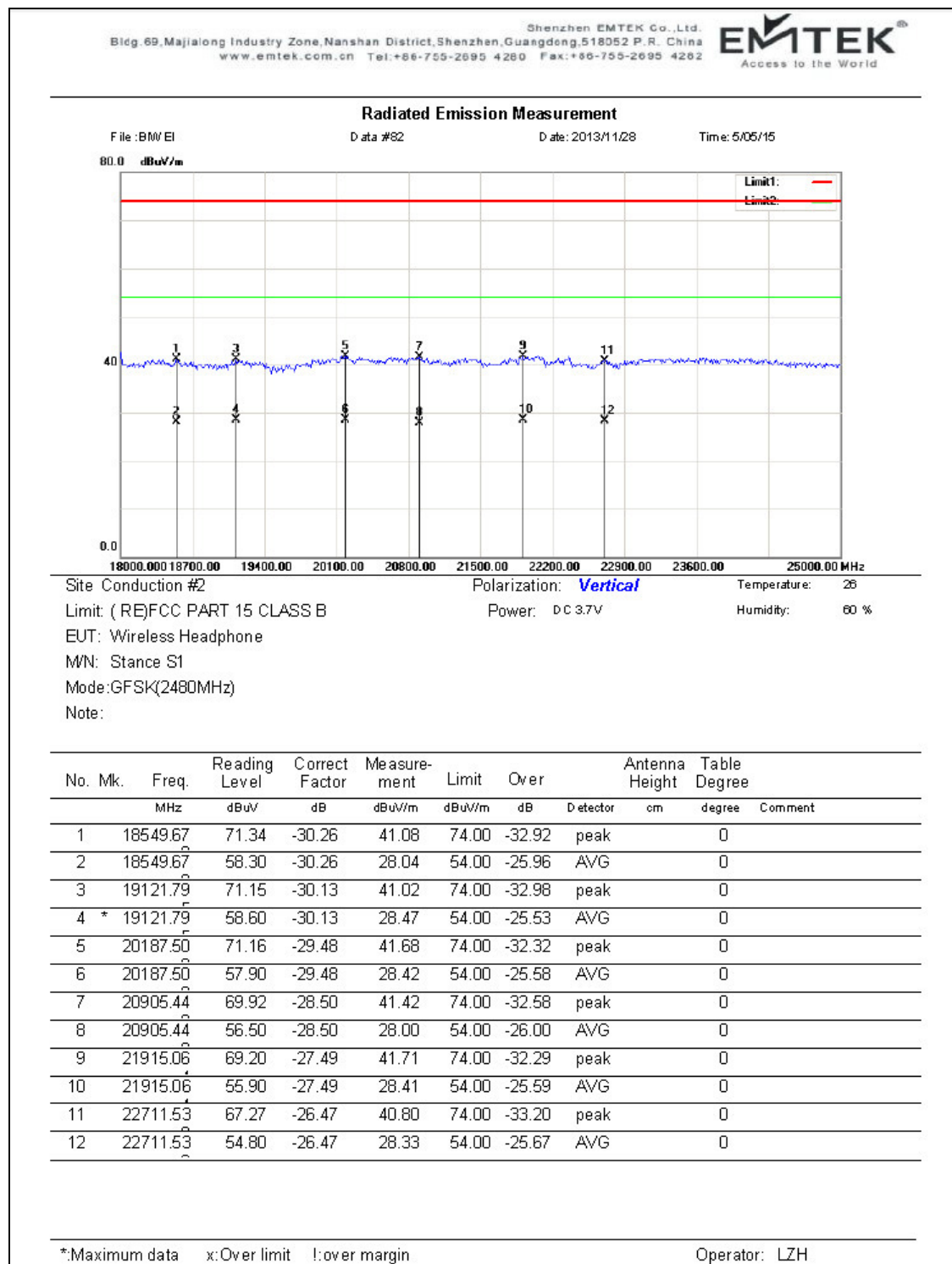
High channel, 18000MHz-25000MHz, horizontal polarization



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High channel, 18000MHz-25000MHz, vertical polarization

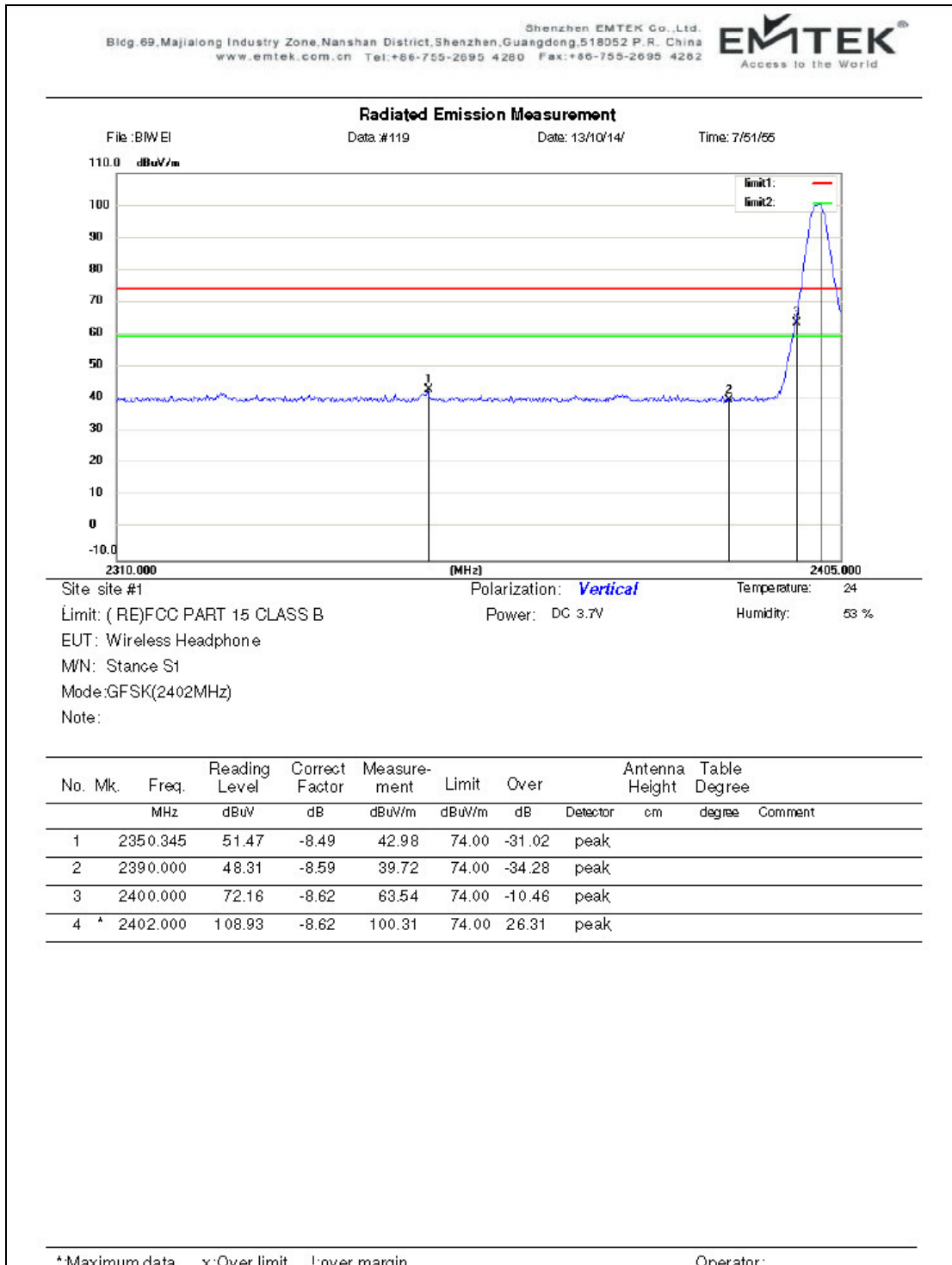


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Test Plot of Band Edge Radiated Spurious Emission

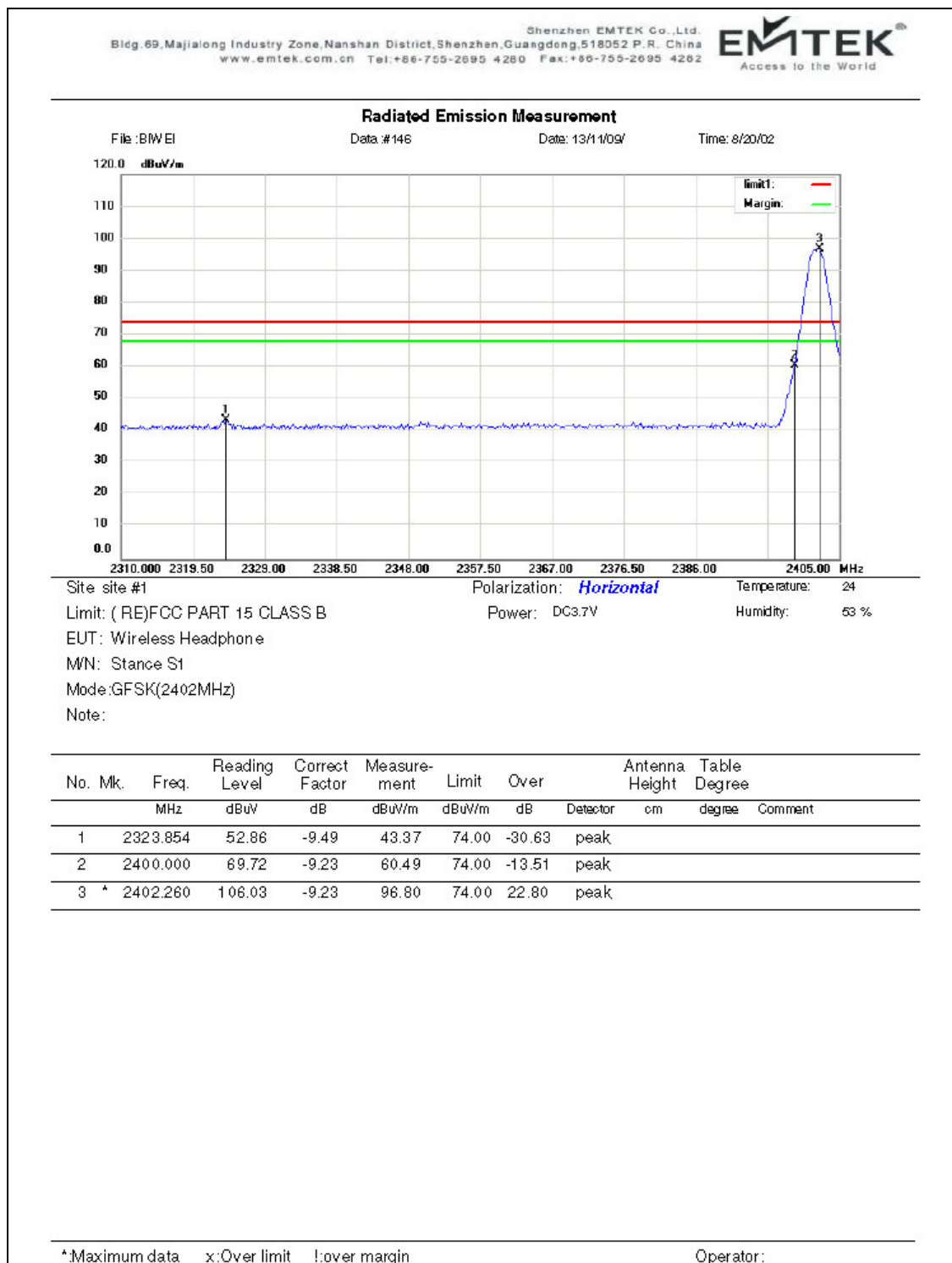
Low channel band edge, vertical polarization



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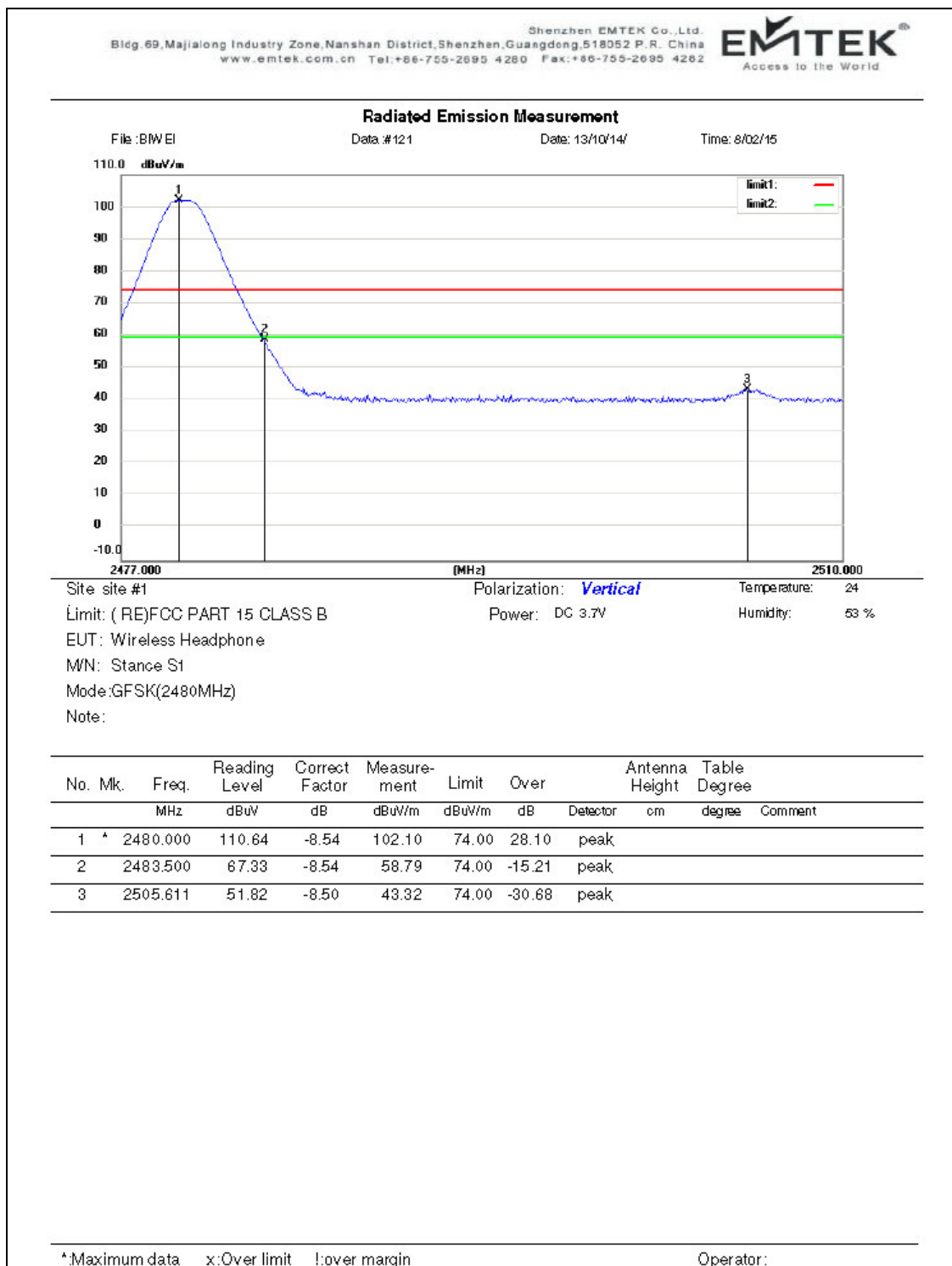
Low channel band edge, horizontal polarization



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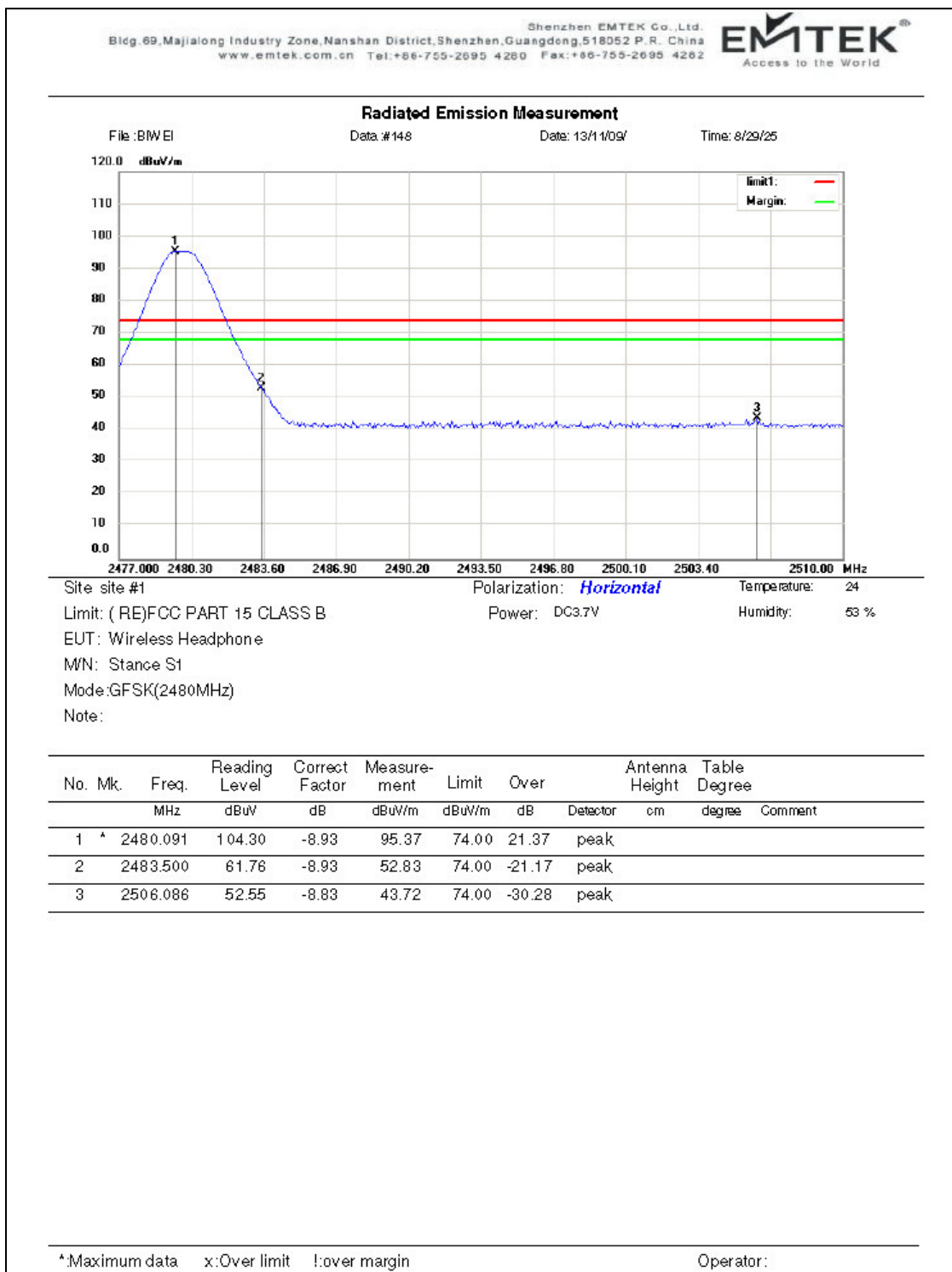
High channel band edge, vertical polarization



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High channel band edge, horizontal polarization



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5.1.7 Conducted Emissions

RESULT:

Pass

Date of testing	:	2013-11-26
Test standard	:	FCC Part 15.107(a)
Basic standard	:	ANSI C63.4: 2009,
Limit	:	Refer to FCC Part 15.107 (a)
Kind of test site	:	Shield room

Test setup

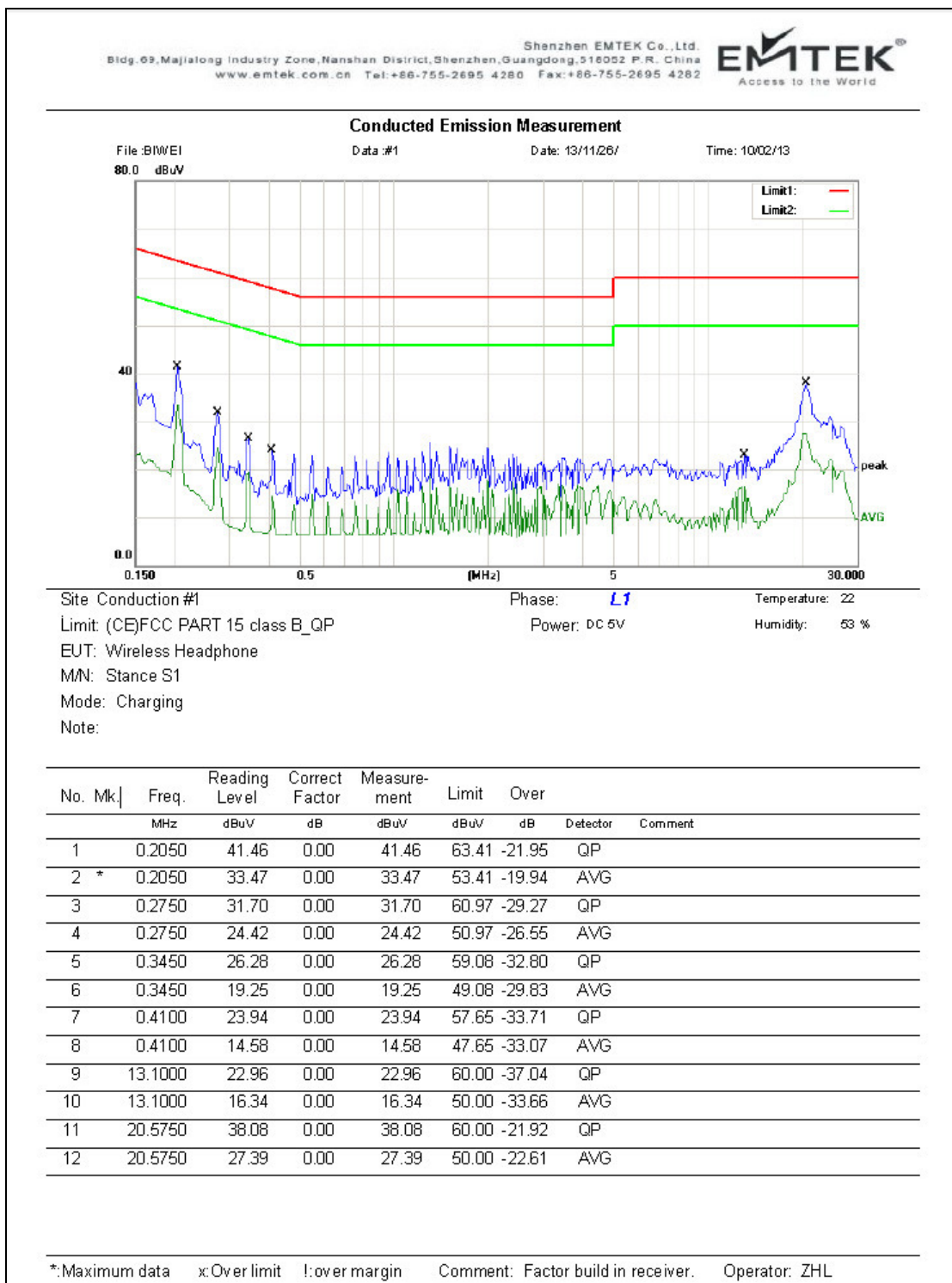
Input Voltage	:	DC 5V via USB Port of Computer
Operation mode	:	C
Ambient temperature	:	22°C
Relative humidity	:	53%
Atmospheric pressure	:	101 kPa

For detail refer to the test plots.

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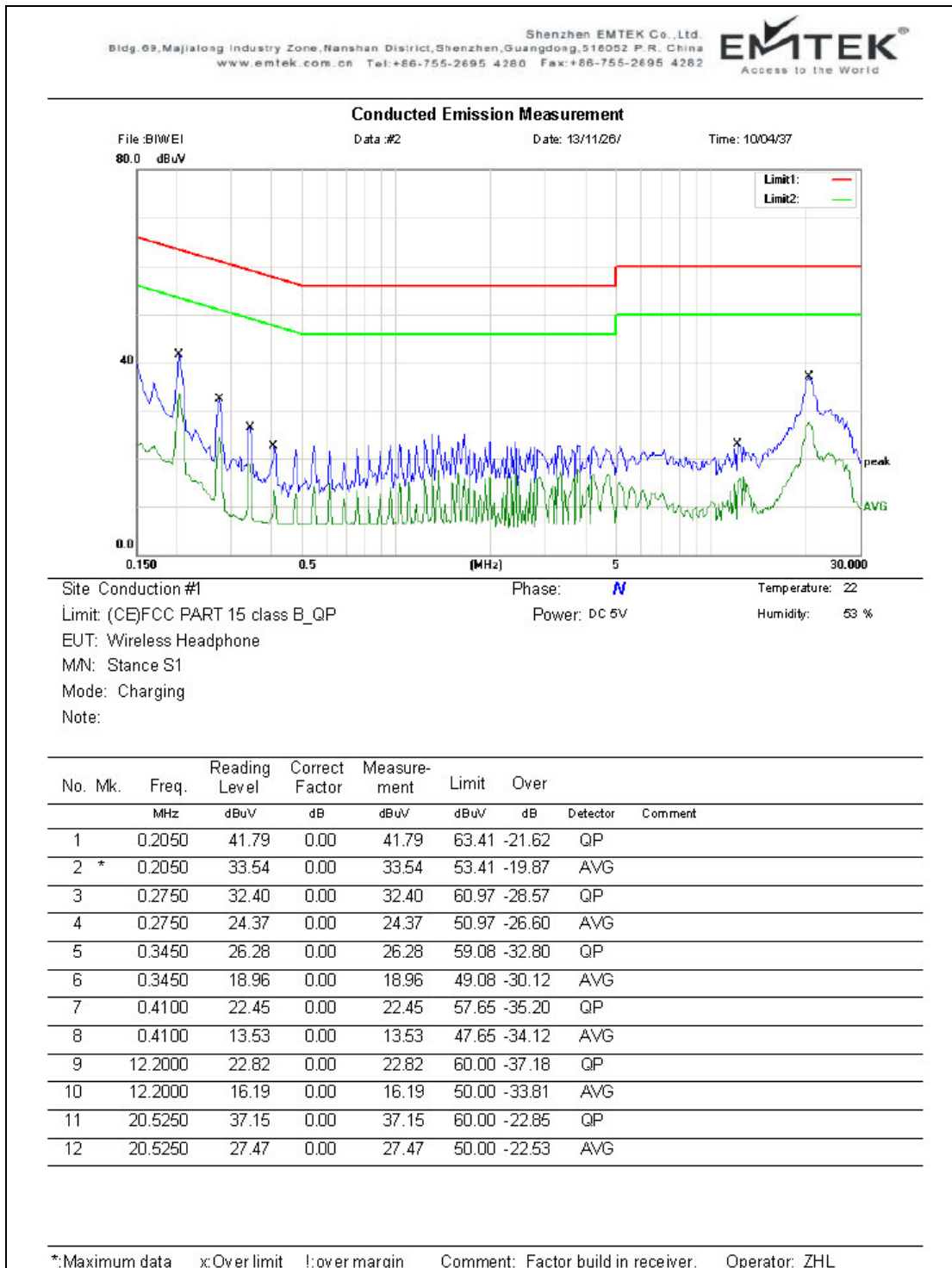
Test Plot of Conducted Emission, Mode C, L1 Line



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Test Plot of Conducted Emission, Mode C, N Line



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5.1.8 Radiated Emissions

RESULT:

Pass

Date of testing	:	2013-11-26
Test standard	:	FCC Part 15.109(a)
Basic standard	:	ANSI C63.4: 2009
Limit	:	Refer to FCC Part 15.109(a)
Kind of test site	:	Shield room

Test Setup

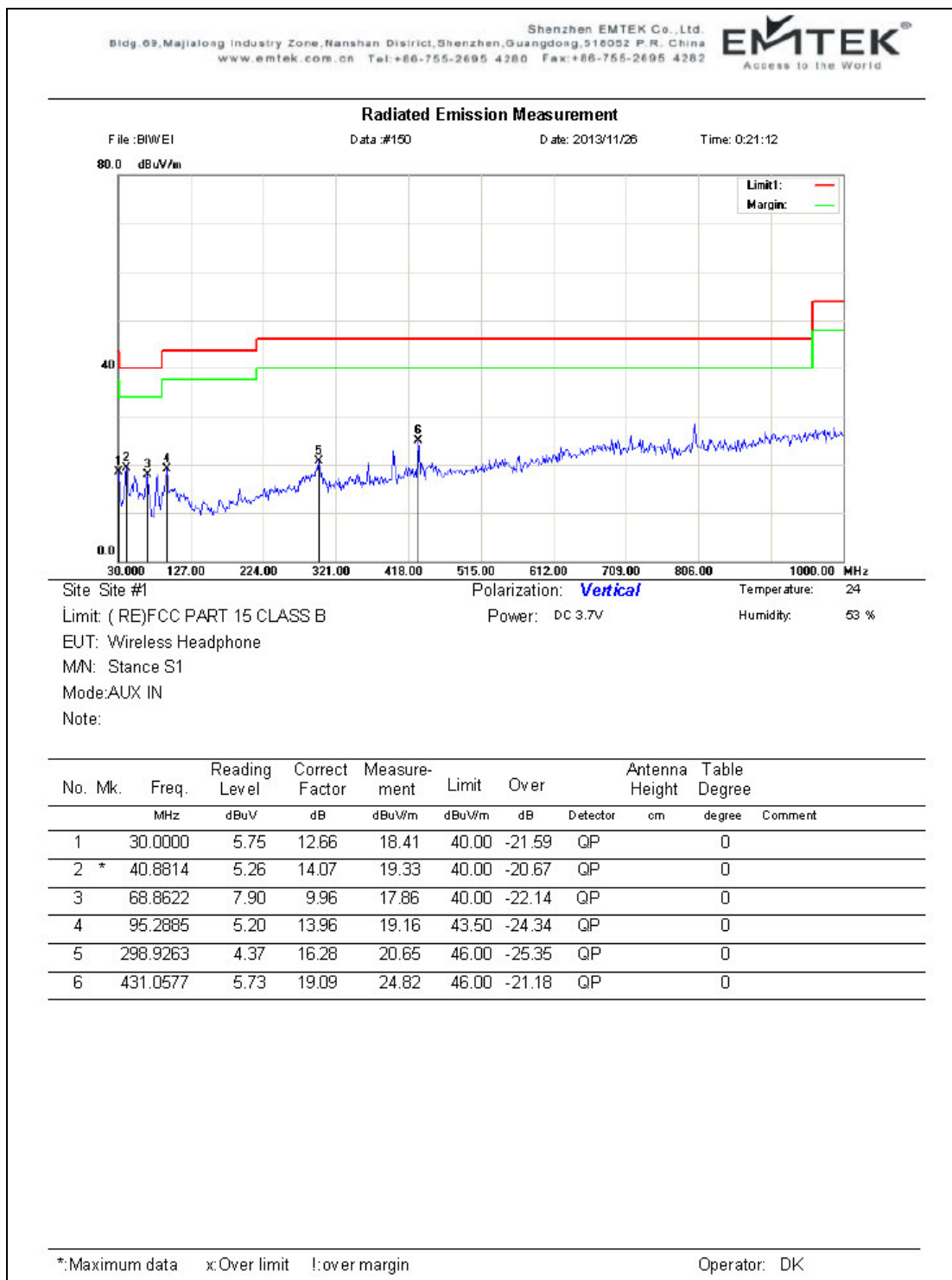
Input Voltage	:	DC 5V via USB Port of Computer DC 3.7V from internal lithium battery
Operation mode	:	B,C
Ambient temperature	:	25°C
Relative humidity	:	55%
Atmospheric pressure	:	101 kPa

For details refer to test plots.

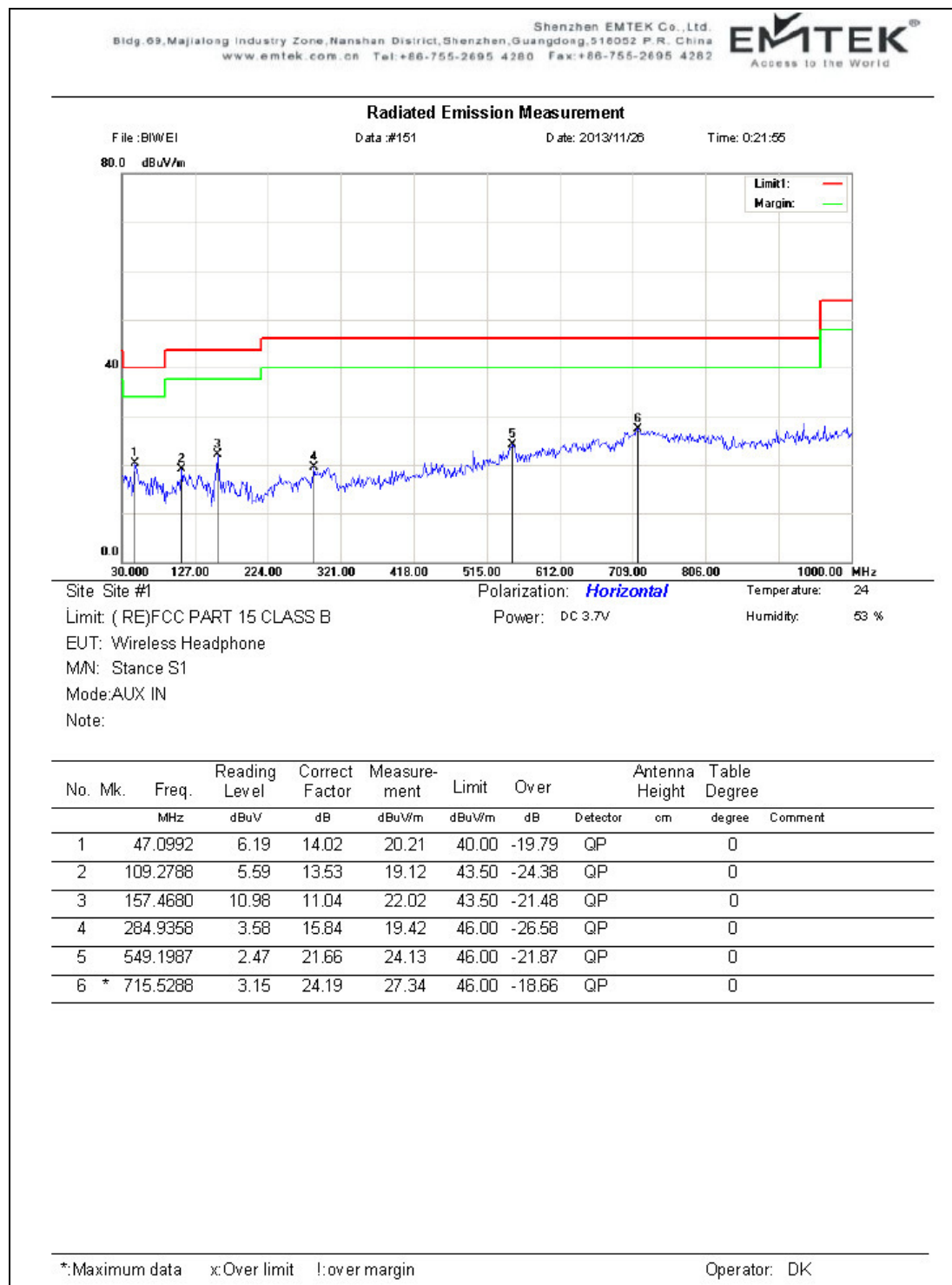
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Test Plot of Radiated Emission, Mode B, Vertical Polarization



Test Plot of Radiated Emission, Mode B, Horizontal Polarization



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Test Plot of Radiated Emission, Mode C, Vertical Polarization

