

1 CO-LOCATION

Specification of Platform Information

The EUT (FCC ID: U2M-PCE3203AH) will be installed in below hosts

Brand Name	Model Name	Product Name	Description
Google	GFRG200	Platform	The platform contains wireless modules as below configurations 1) FCC ID: U2M-PCE3203AH + FCC ID: NKRDXA-GO1 2) FCC ID: U2M-PCE3203AH + FCC ID: U2M-PCE4553AH
Google	GFRG210	Platform	The platform contains wireless modules as below configurations 1) FCC ID: U2M-PCE3203AH + FCC ID: NKRDXA-GO1 2) FCC ID: U2M-PCE3203AH + FCC ID: U2M-PCE4553AH

Note: The platform supports simultaneous transmission and separation distance of simultaneous transmitting antennas is less than 20 cm thus evaluation of co-location is required.

Specification of the Wireless Certified Modules

FCC ID	NKRDXA-GO1
Product Name	802.11ac 3*3 PCIe module
Brand Name	WNC
Model Name	DAXA-GO1
Operating Frequency	802.11a/n/ac: 5180 MHz ~ 5240 MHz / 5745 ~ 5825 MHz
Modulation Type	802.11a/n/ac: OFDM (BPSK / QPSK / 16QAM / 64QAM/ 256QAM)

FCC ID	U2M-PCE4553AH
Product Name	802.11 3T3R a/n/ac module
Brand Name	Senao
Model Name	PCE4553AH
Operating Frequency	802.11a/n/ac: 5180 MHz ~ 5240 MHz / 5745 ~ 5825 MHz
Modulation Type	802.11a/n/ac: OFDM (BPSK / QPSK / 16QAM / 64QAM/ 256QAM)

Antenna Details of Specific Platform

Ant. No.	Model	Type	Connector	Operating Frequencies (MHz) / Antenna Gain (dBi)			
				5150~5250	5250~5350	5470~5725	5725~5850
1	1002299	Printed	UFL	3.88	3.5	4.33	4.2
2	1002300	Printed	UFL	2.62	3.16	2.46	4.02
3	1002301	Printed	UFL	4.16	4.23	3.65	3.43

Note: Above antennas are certified with wireless modules, FCC ID: NKRDXA-GO1.

Ant. No.	Model	Type	Connector	Operating Frequencies (MHz) / Antenna Gain (dBi)			
				5150~5250	5250~5350	5470~5725	5725~5850
1	Ant 2 (1002299)	PCB Dipole	UFL	3.875	3.4965	4.3331	4.2025
2	Ant 4 (1002300)	PCB Dipole	UFL	2.6248	3.1641	2.4641	4.0181
3	Ant 6 (1002301)	PCB Dipole	UFL	4.1618	4.2337	3.6489	3.4374

Note: Above antennas are certified with wireless modules, FCC ID: U2M-PCE4553AH.

Accessories of Specific Platform

Accessories		
No.	Equipment	Description
1	AC adapter	Brand Name: Google Model Name: PB-1600-29 Power Rating: I/P: 100-120Vac, 50-60Hz, 2.0A O/P: 12Vdc, 5A DC 1.75m non-shielded cable w/o core
2	AC adapter	Brand Name: Google Model Name: OTD018 Power Rating: I/P: 100-120Vac, 50-60Hz, 2.0A O/P: 12Vdc, 5A DC 1.75m non-shielded cable w/o core

2 TEST CONFIGURATION

2.1 Testing Condition

Test Item	Test Site	Ambient Condition	Tested By
Radiated Emissions	03CH03-HY	25°C / 62%	Mark Liao

- FCC site registration No.: 636805
- IC site registration No.: 4086B-1

2.2 The Worst Test Modes and Channel Details

Test item	Modulation Mode	Test Channel	Data Rate	Test Configuration
Radiated Emissions	2.4G 11g + 5G 11ac VHT40	CH6 + CH159	6Mbps + MCS 0	1, 2, 3, 4
<p>Note:</p> <ol style="list-style-type: none">2 AC adapters are used for this device. After pre-test, AC adapter 2 was the worst case and was selected for final testing.The selected channel is the maximum power channel of each Wi-Fi module.Test Configurations are listed as follows: Test Configuration 1: Platform GFRG200: 2.4G(FCC ID: U2M-PCE3203AH) + 5G(FCC ID: NKRDXA-GO1) Test Configuration 2: Platform GFRG200: 2.4G(FCC ID: U2M-PCE3203AH) + 5G(FCC ID: U2M-PCE4553AH) Test Configuration 3: Platform GFRG210: 2.4G(FCC ID: U2M-PCE3203AH) + 5G(FCC ID: NKRDXA-GO1) Test Configuration 4: Platform GFRG210: 2.4G(FCC ID: U2M-PCE3203AH) + 5G(FCC ID: U2M-PCE4553AH)				

3 TEST RESULTS

3.1 Transmitter Unwanted Emissions

3.1.1 Transmitter Unwanted Emissions Limit

Restricted Band Emissions Limit			
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1: Test distance for frequencies at or above 30 MHz, measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

Note 2: Test distance for frequencies at below 30 MHz, measurements may be performed at a distance closer than the EUT limit distance; however, an attempt should be made to avoid making measurements in the near field. When performing measurements below 30 MHz at a closer distance than the limit distance, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two or more distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). The test report shall specify the extrapolation method used to determine compliance of the EUT.

Un-restricted Band Emissions Limit	
RF output power procedure	Limit (dB)
Peak output power procedure	20
Average output power procedure	30

Note 1: If the peak output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum measured in-band peak PSD level.

Note 2: If the average output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the power in any 100 kHz outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum measured in-band average PSD level.

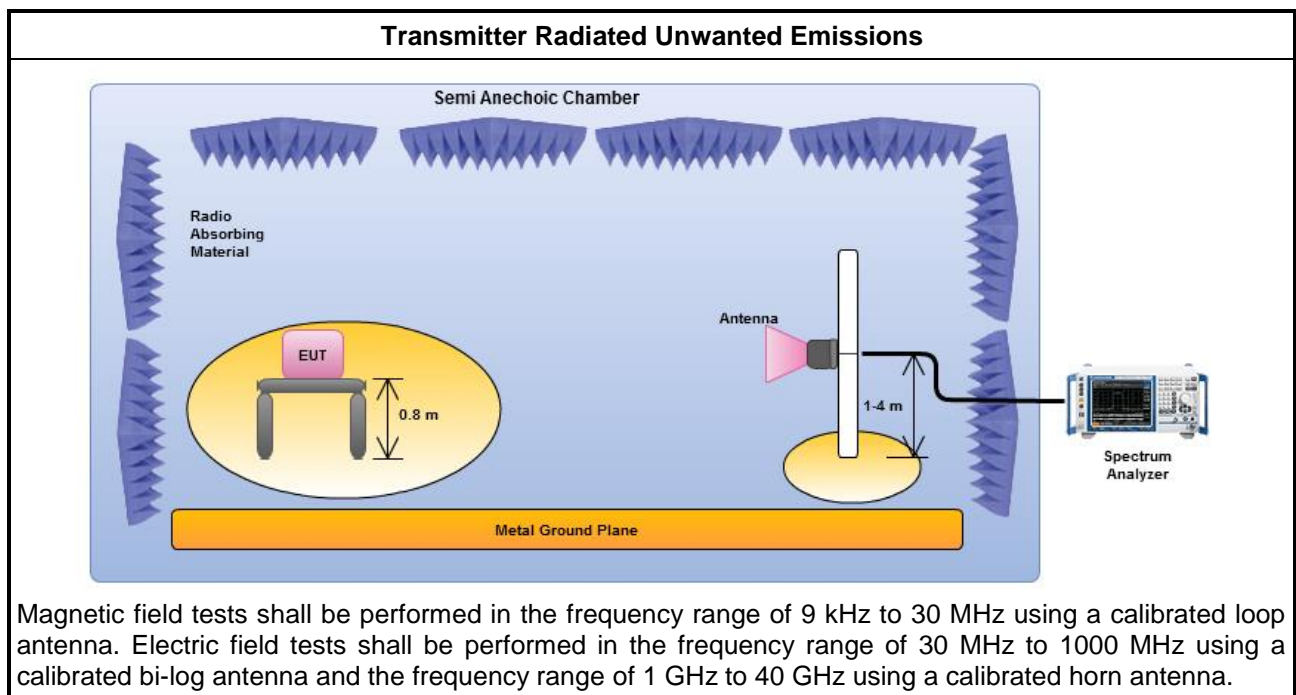
3.1.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

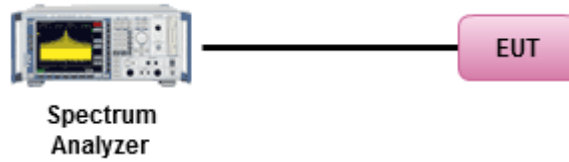
3.1.3 Test Procedures

Test Method	
<input checked="" type="checkbox"/>	Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).
<input checked="" type="checkbox"/>	For the transmitter unwanted emissions shall be measured using following options below:
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW). $VBW \geq 1/T$, where T is pulse time.
<input checked="" type="checkbox"/>	Refer as KDB 558074, clause 12.2.3 measurement procedure peak limit.
<input checked="" type="checkbox"/>	For radiated measurement, refer as ANSI C63.10,
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.4 for radiated emissions from below 30 MHz.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.5 for radiated emissions from 30 MHz to 1000 MHz.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.6 for radiated emissions from above 1 GHz.

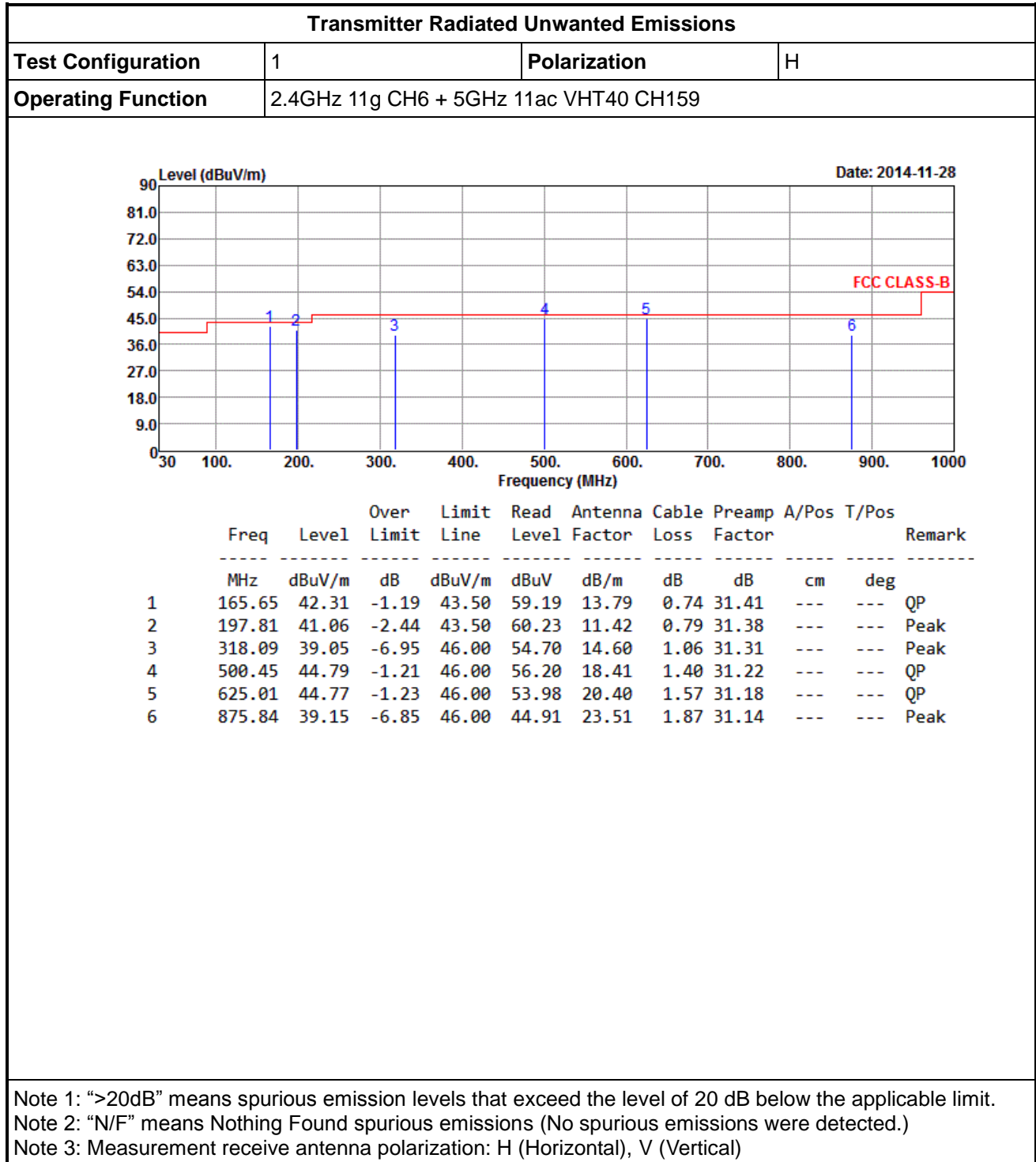
3.1.4 Test Setup

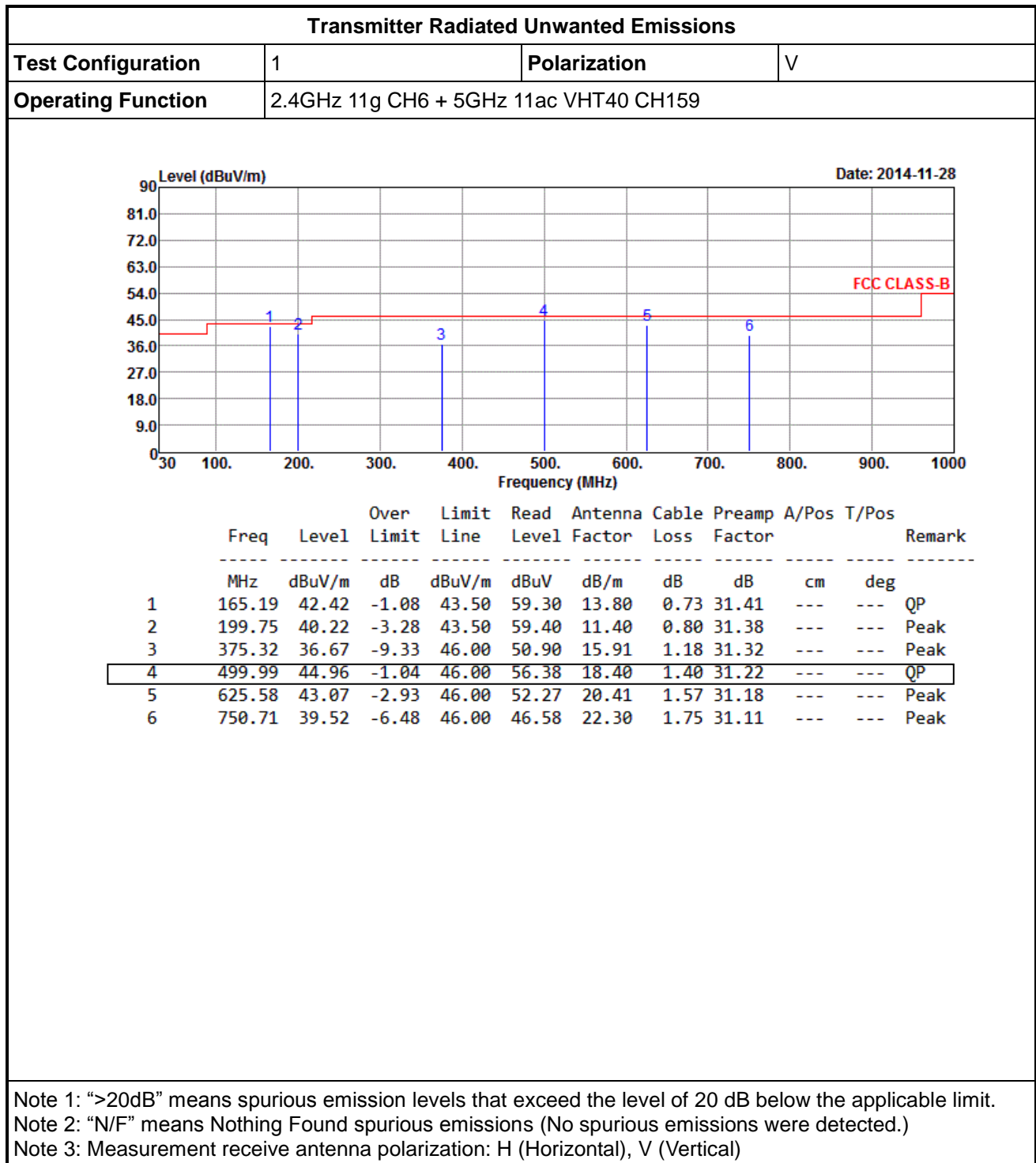


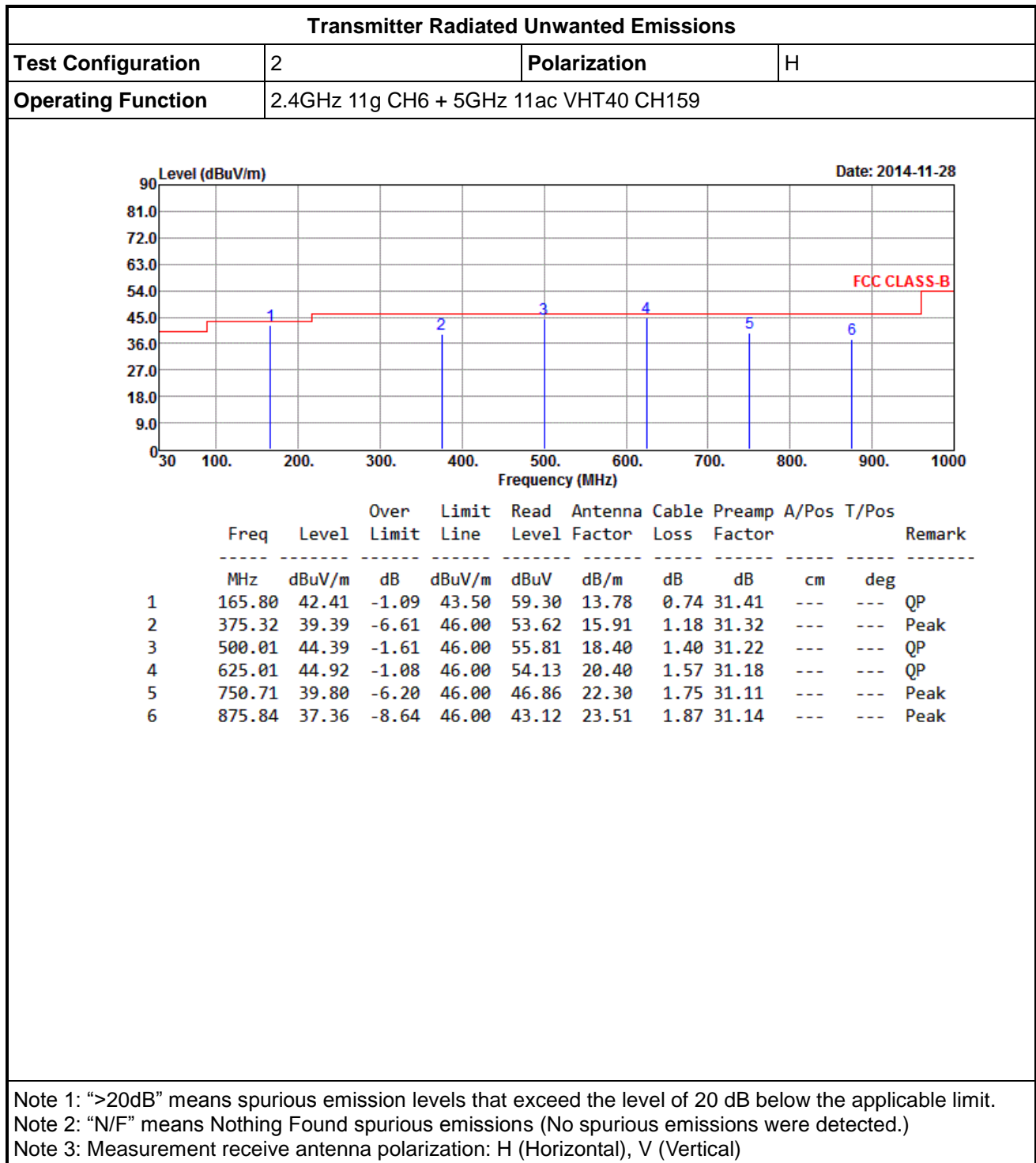
Note: Test distance is 3m.

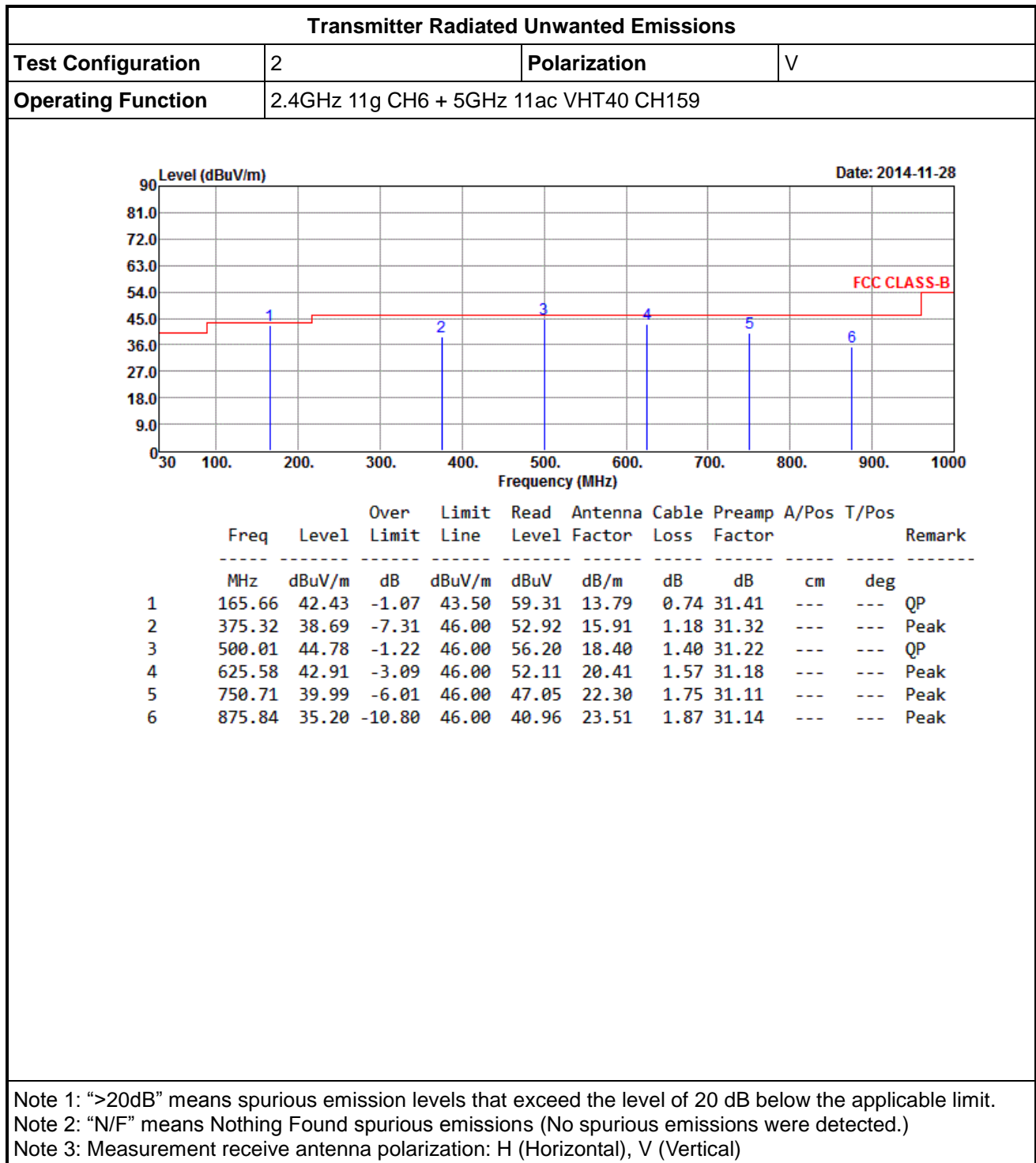
Transmitter Conducted Unwanted Emissions**3.1.5 Transmitter Radiated Unwanted Emissions (Below 30MHz)**

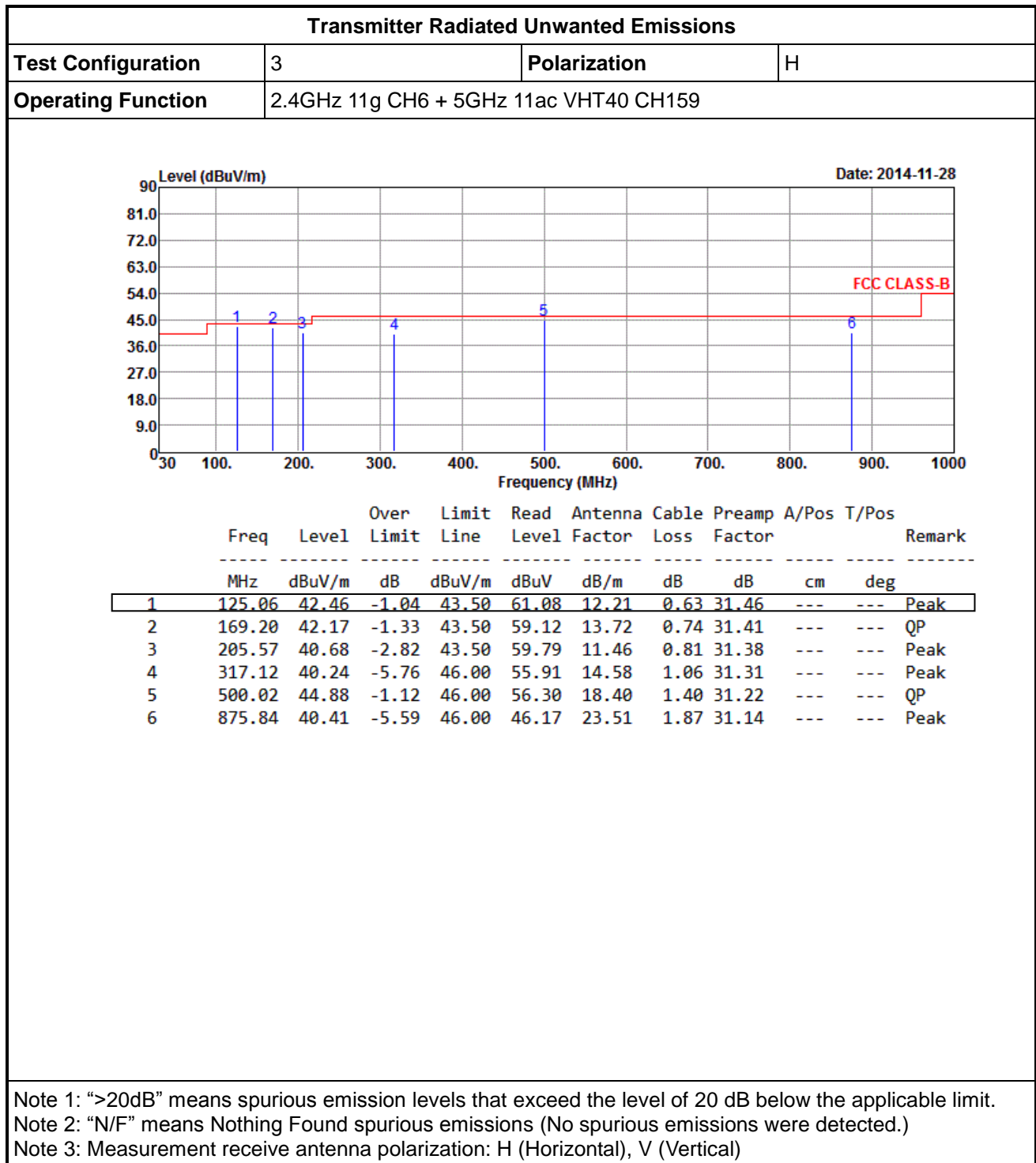
All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

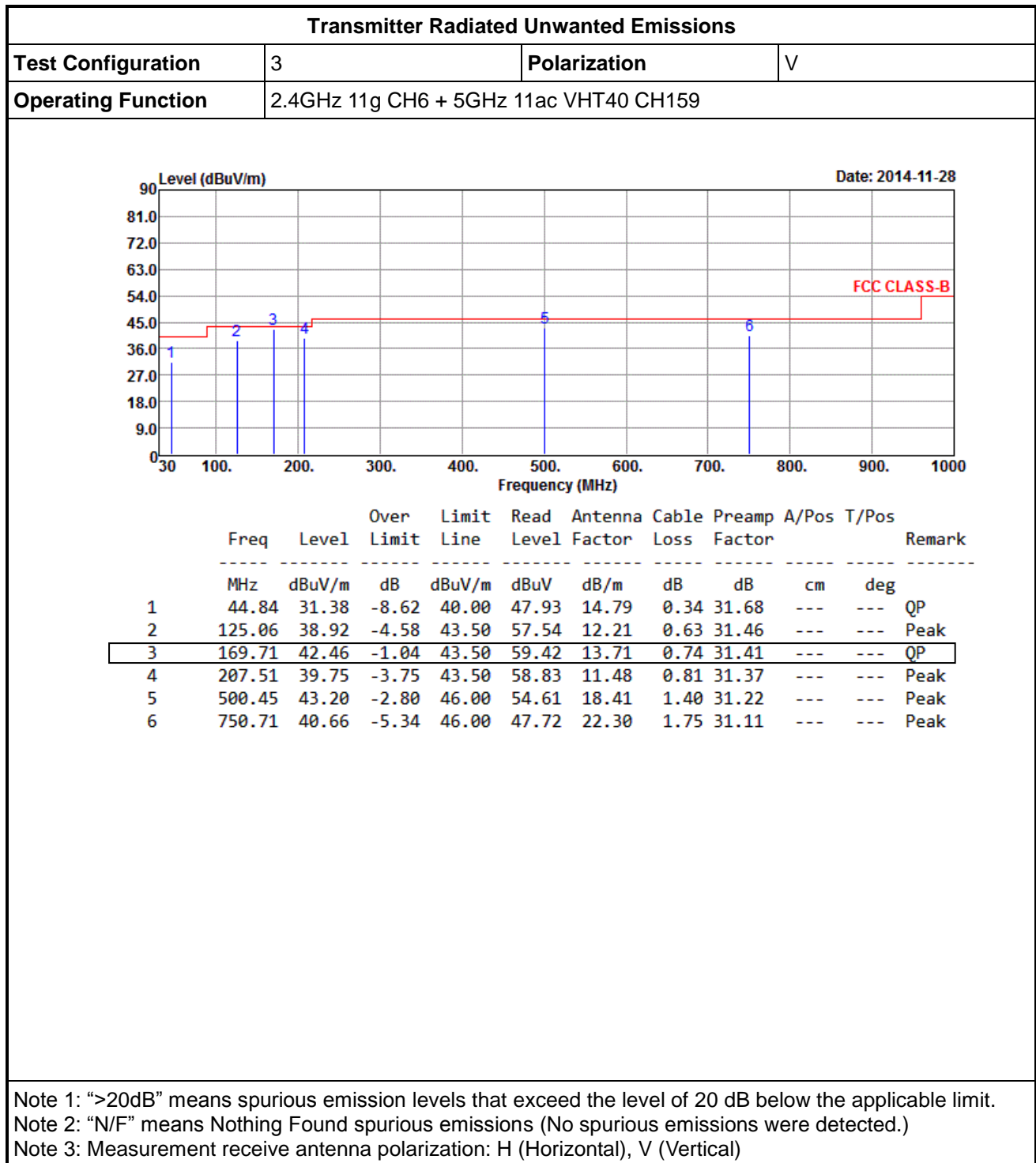
3.1.6 Results of Radiated Emissions (Below 1GHz)


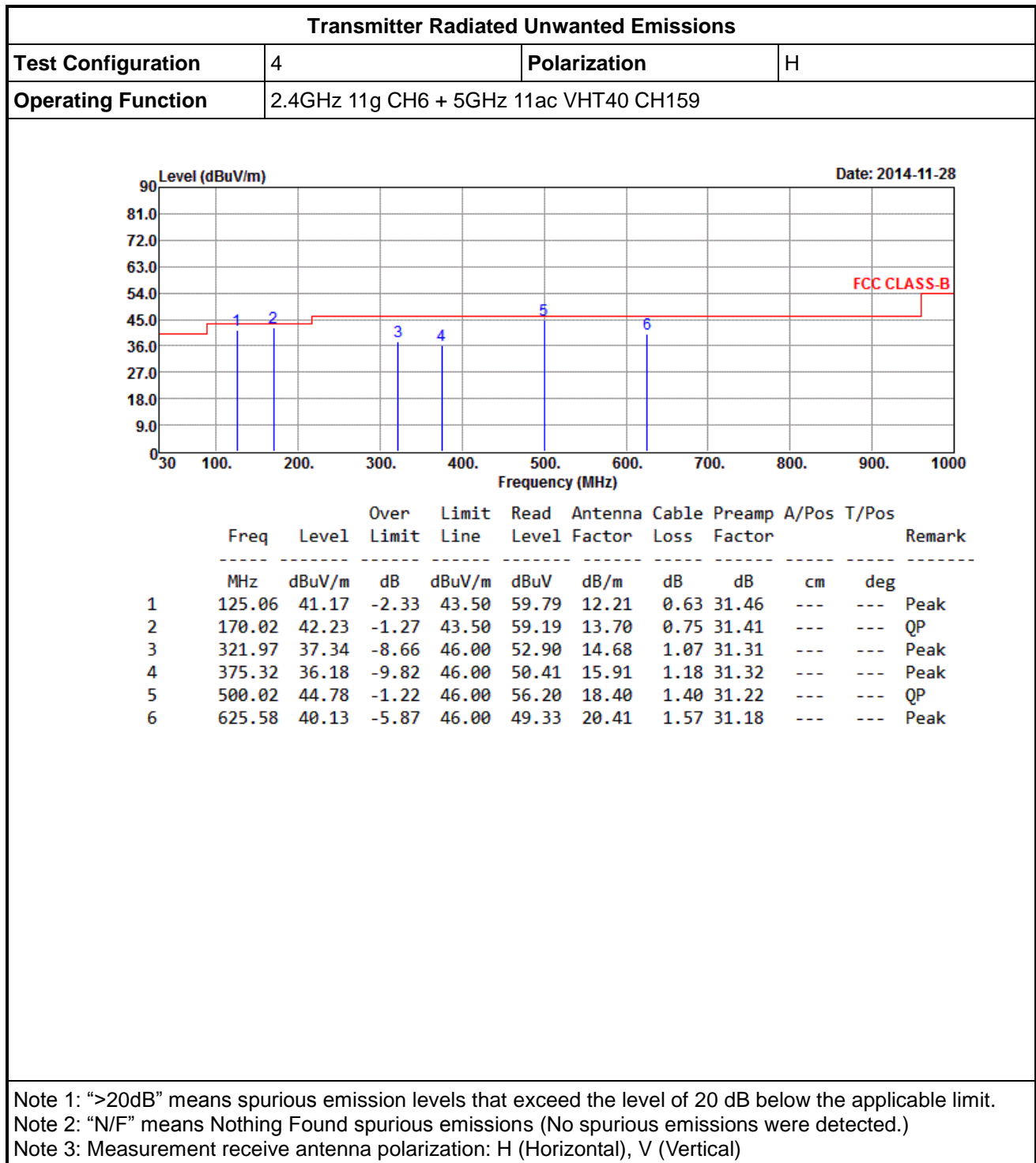


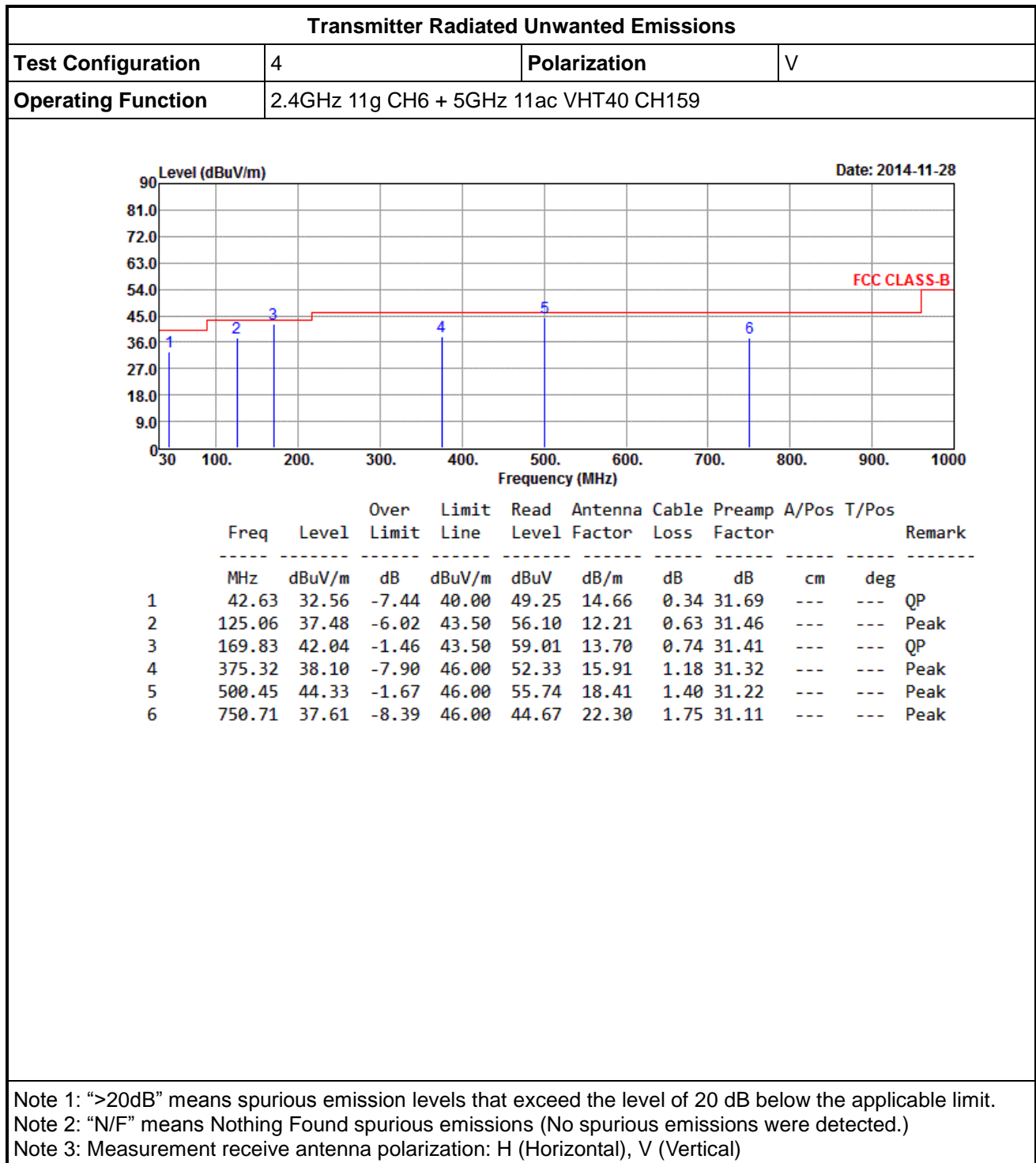


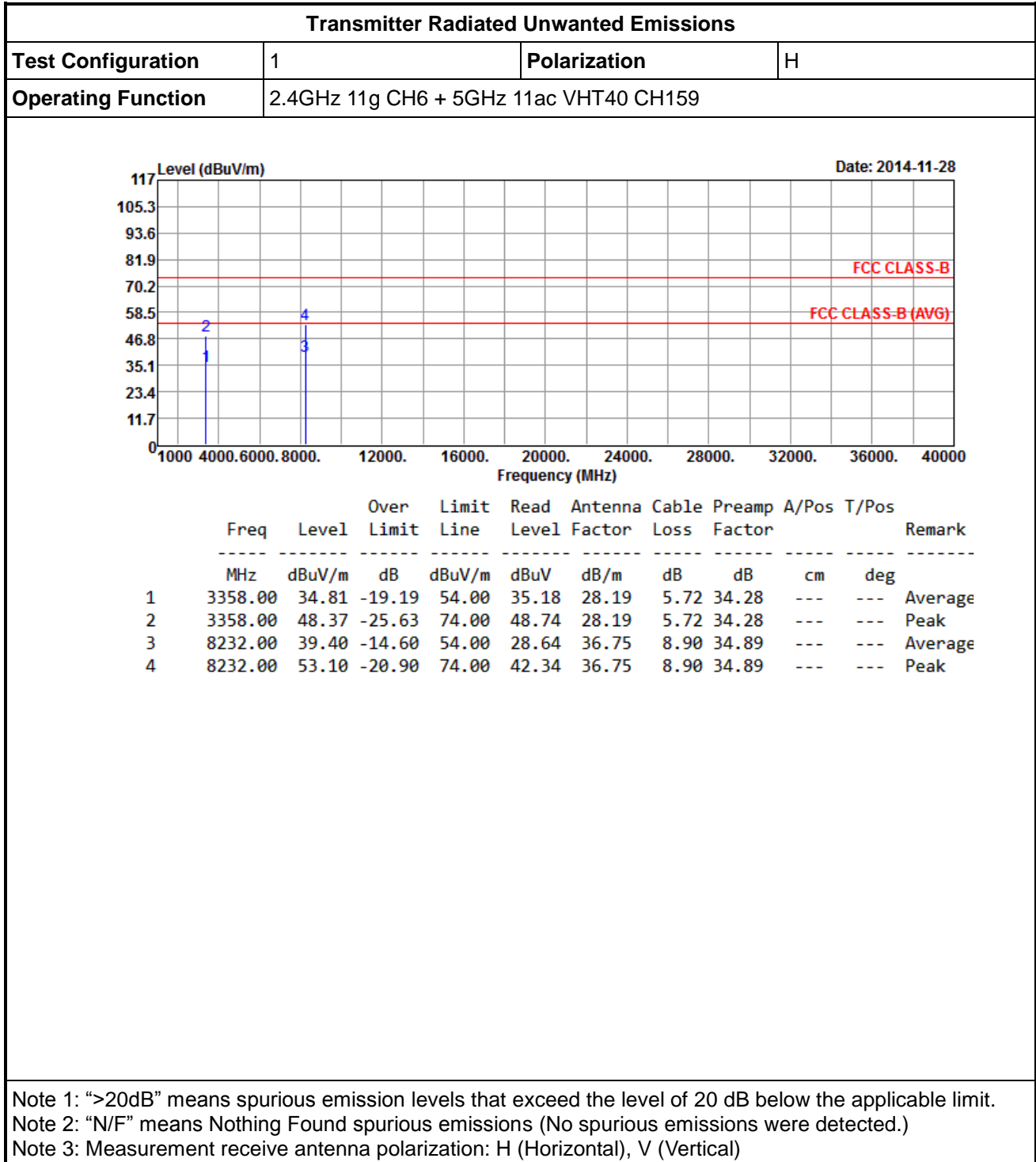


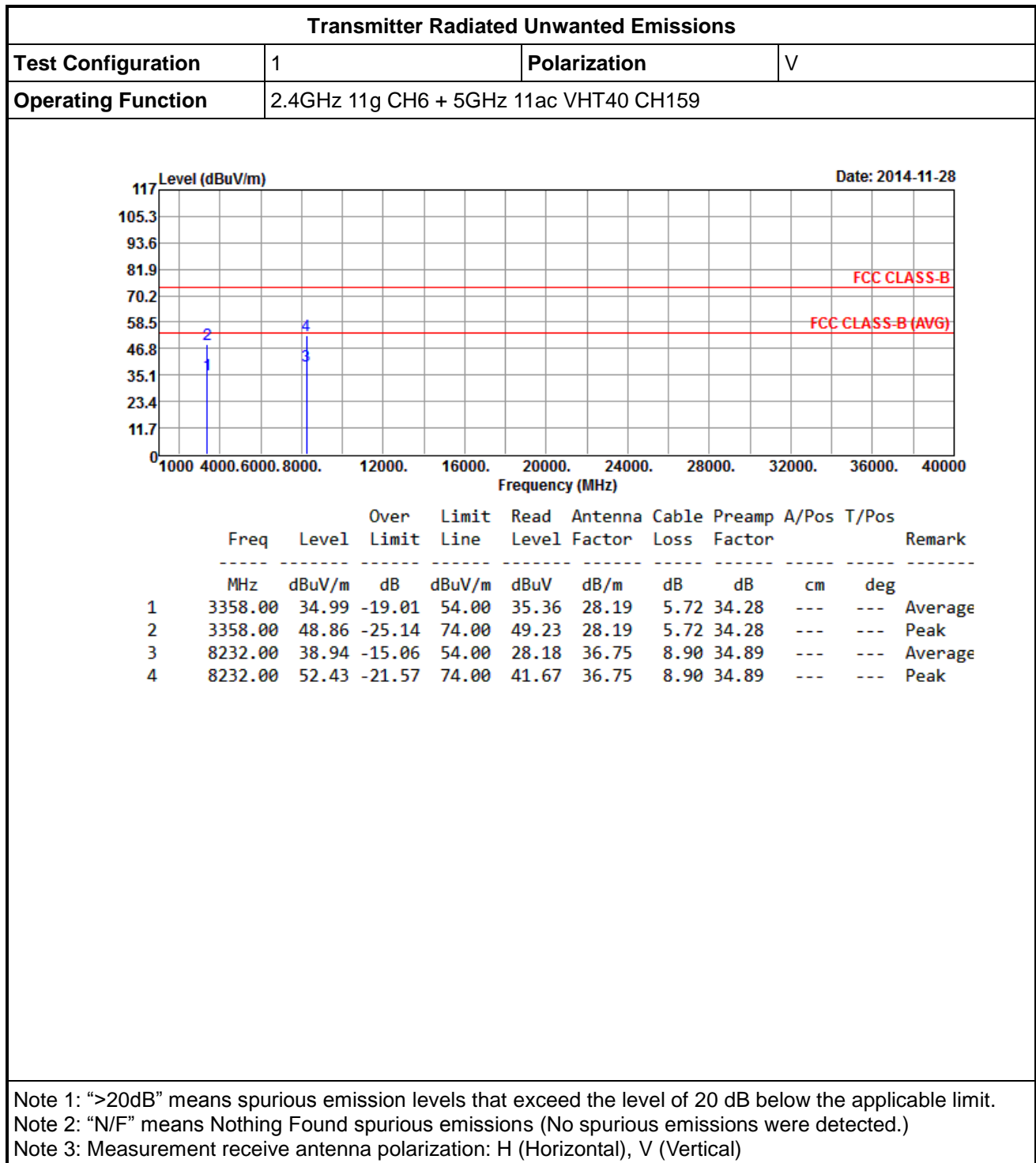


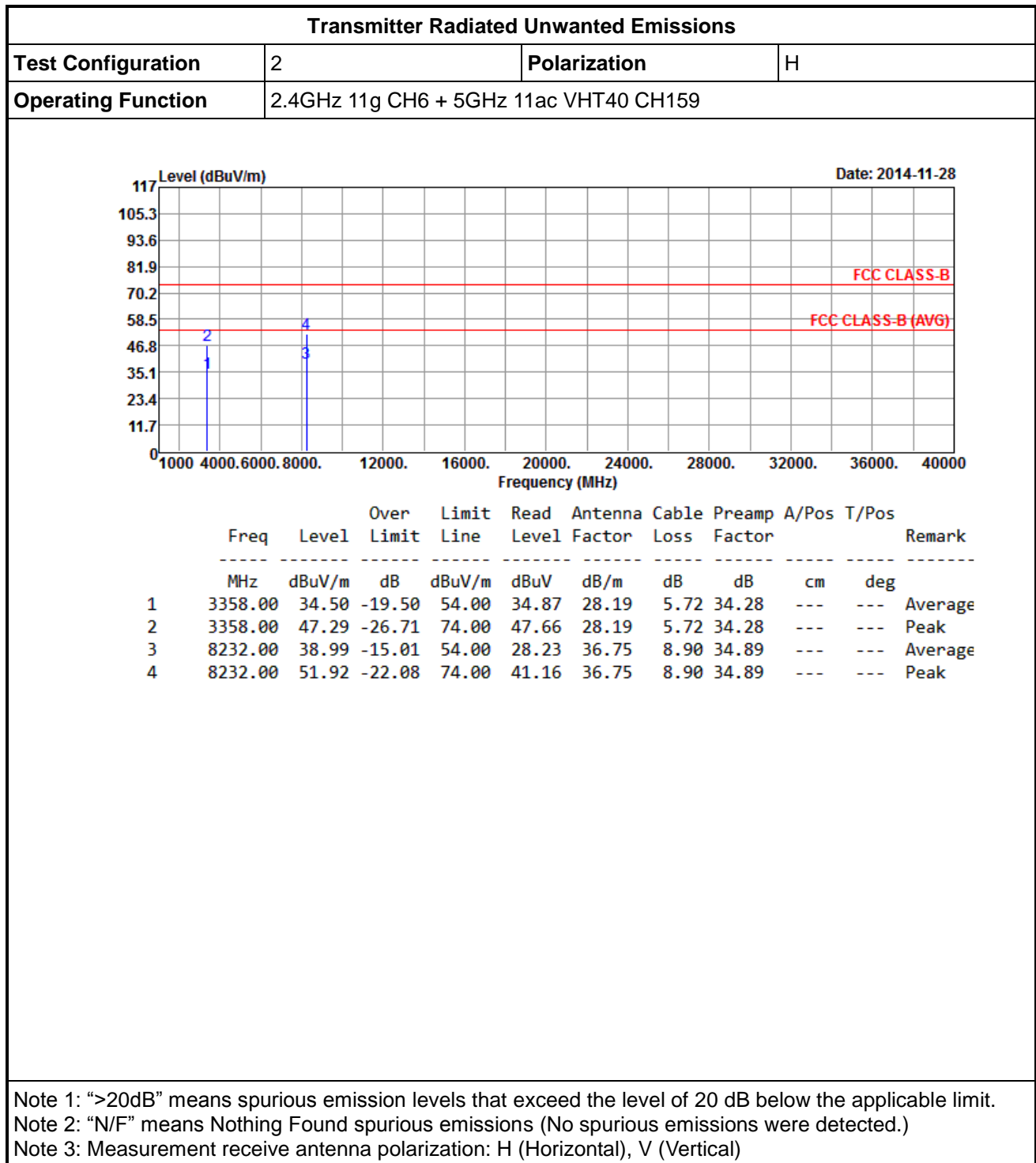


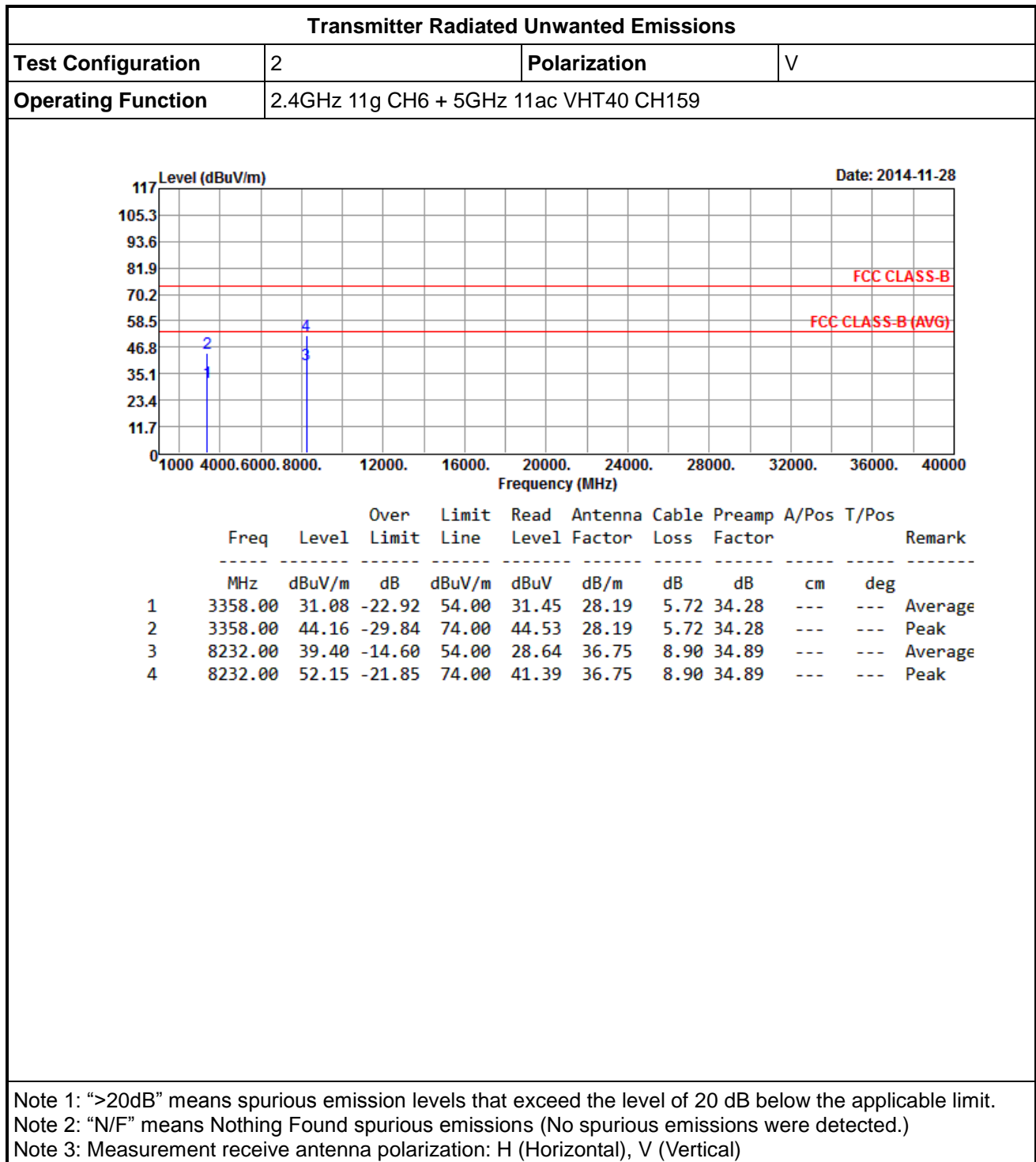


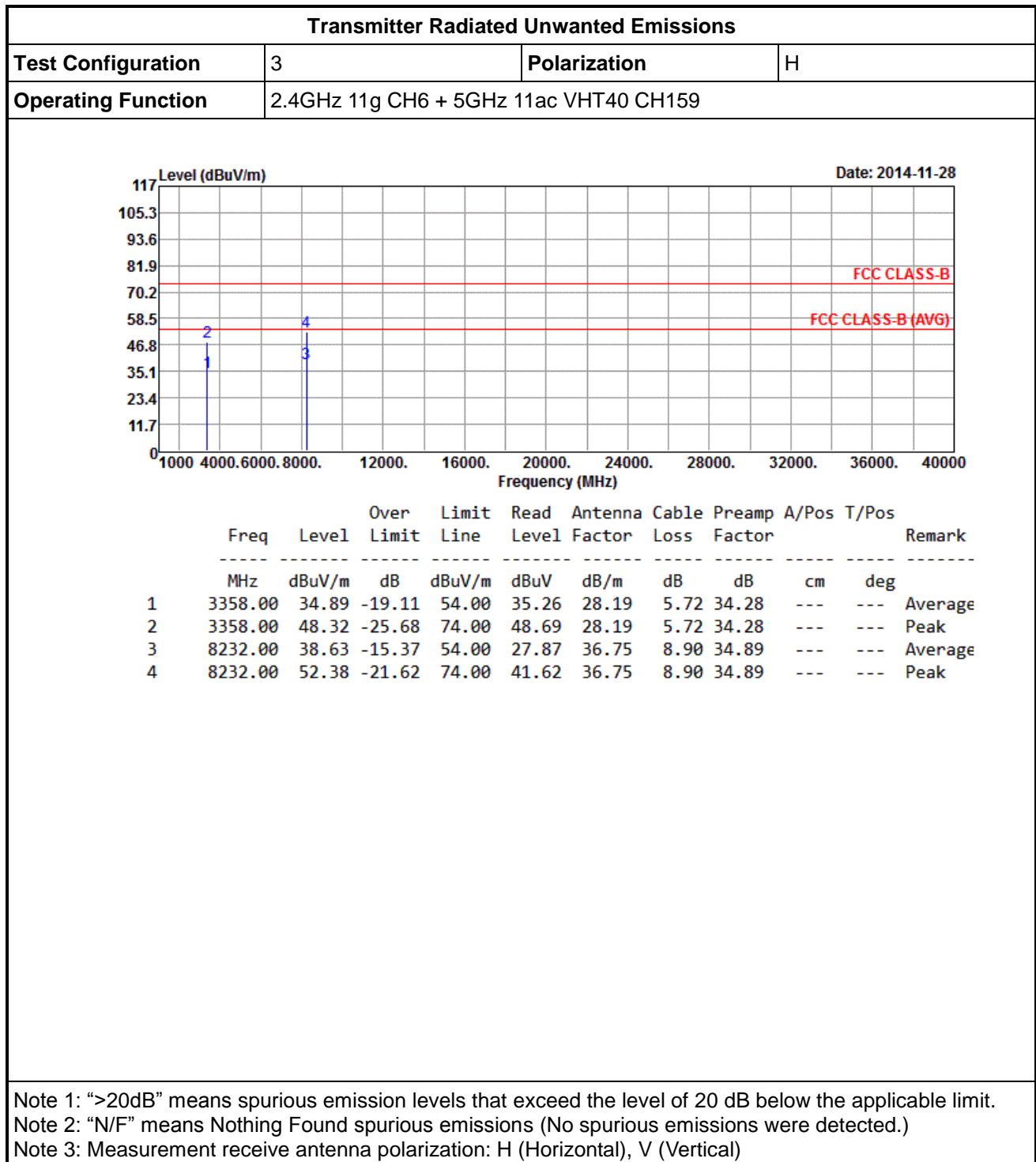


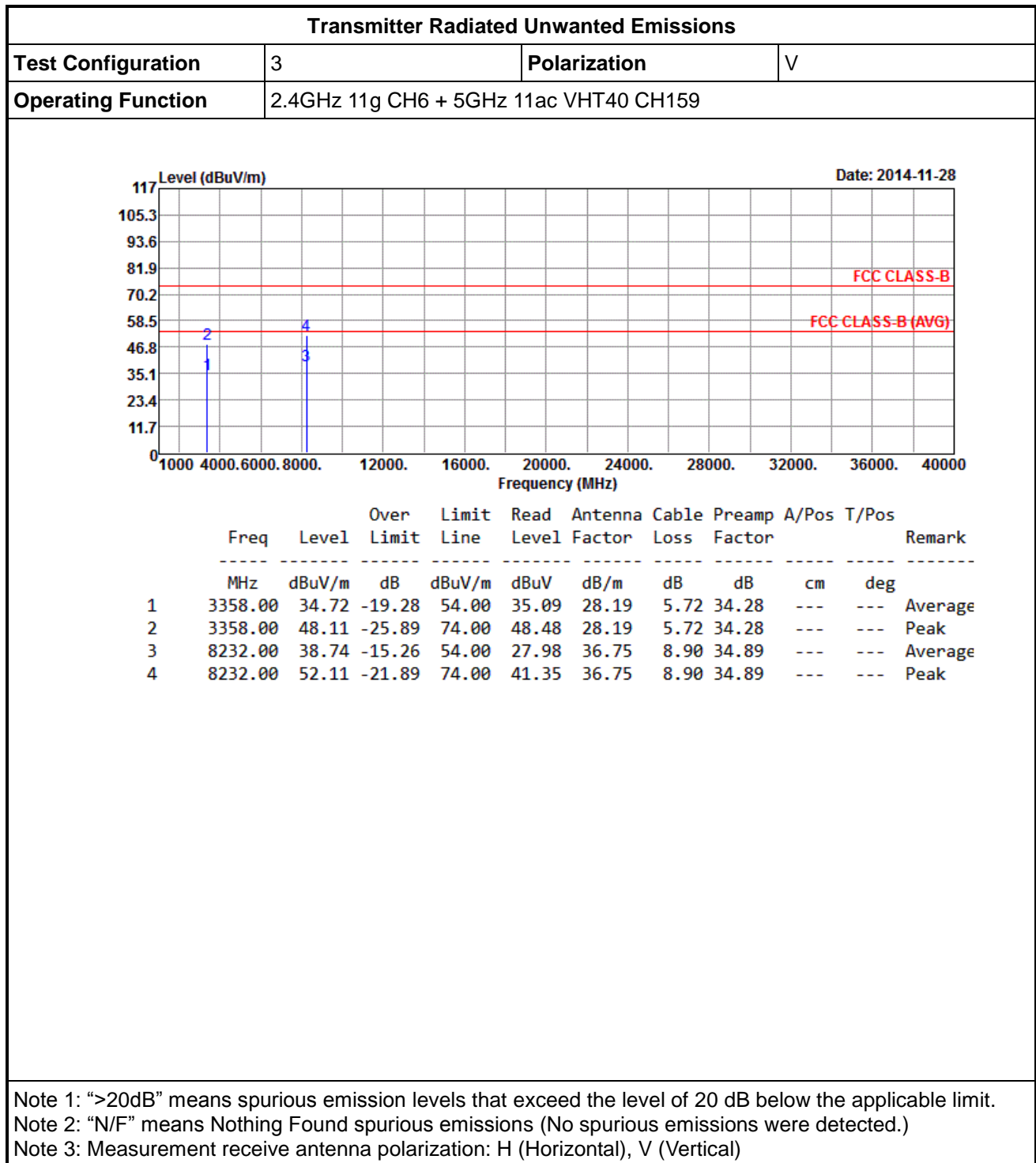
3.1.7 Results for Radiated Emissions (Above 1GHz)


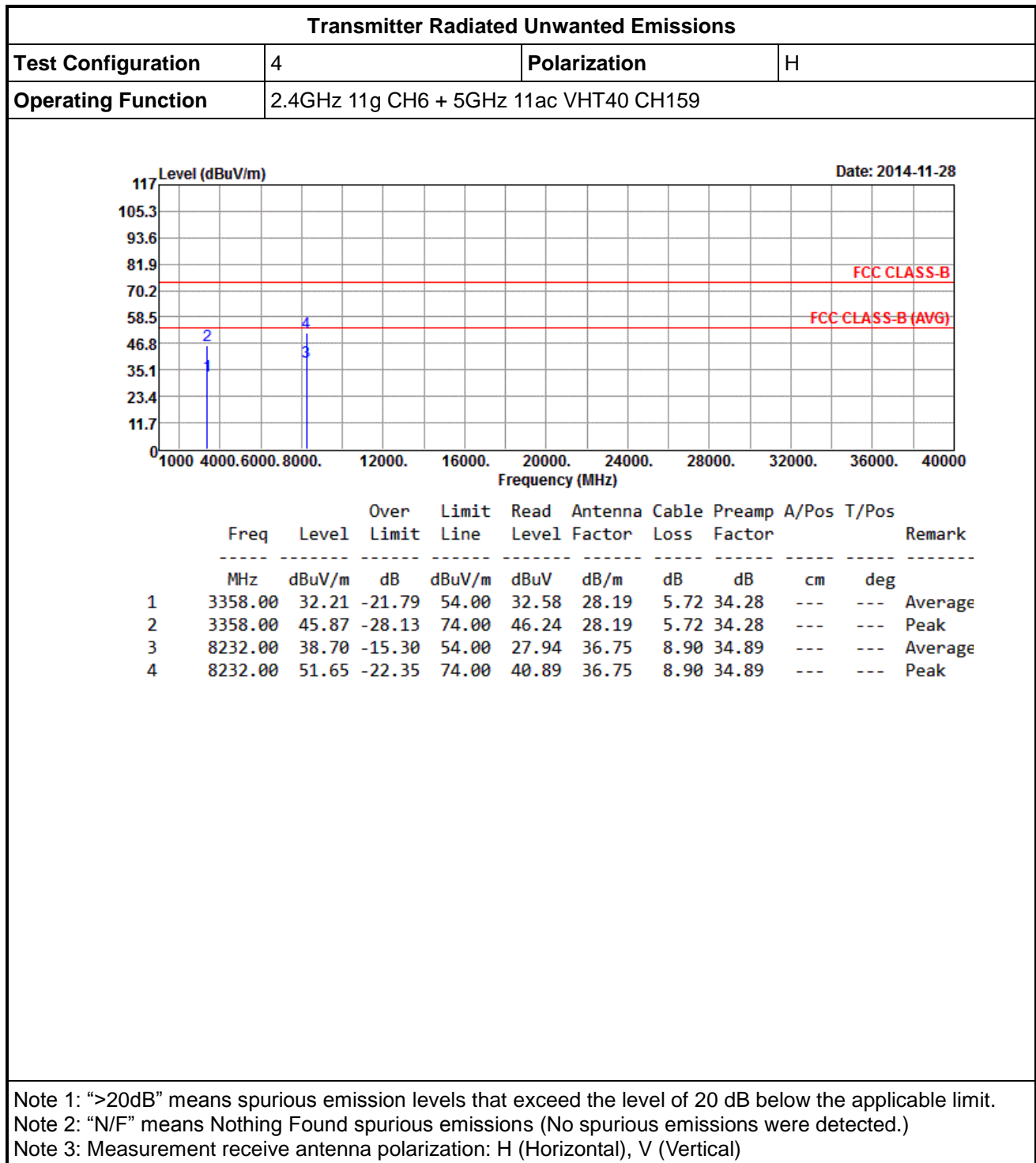


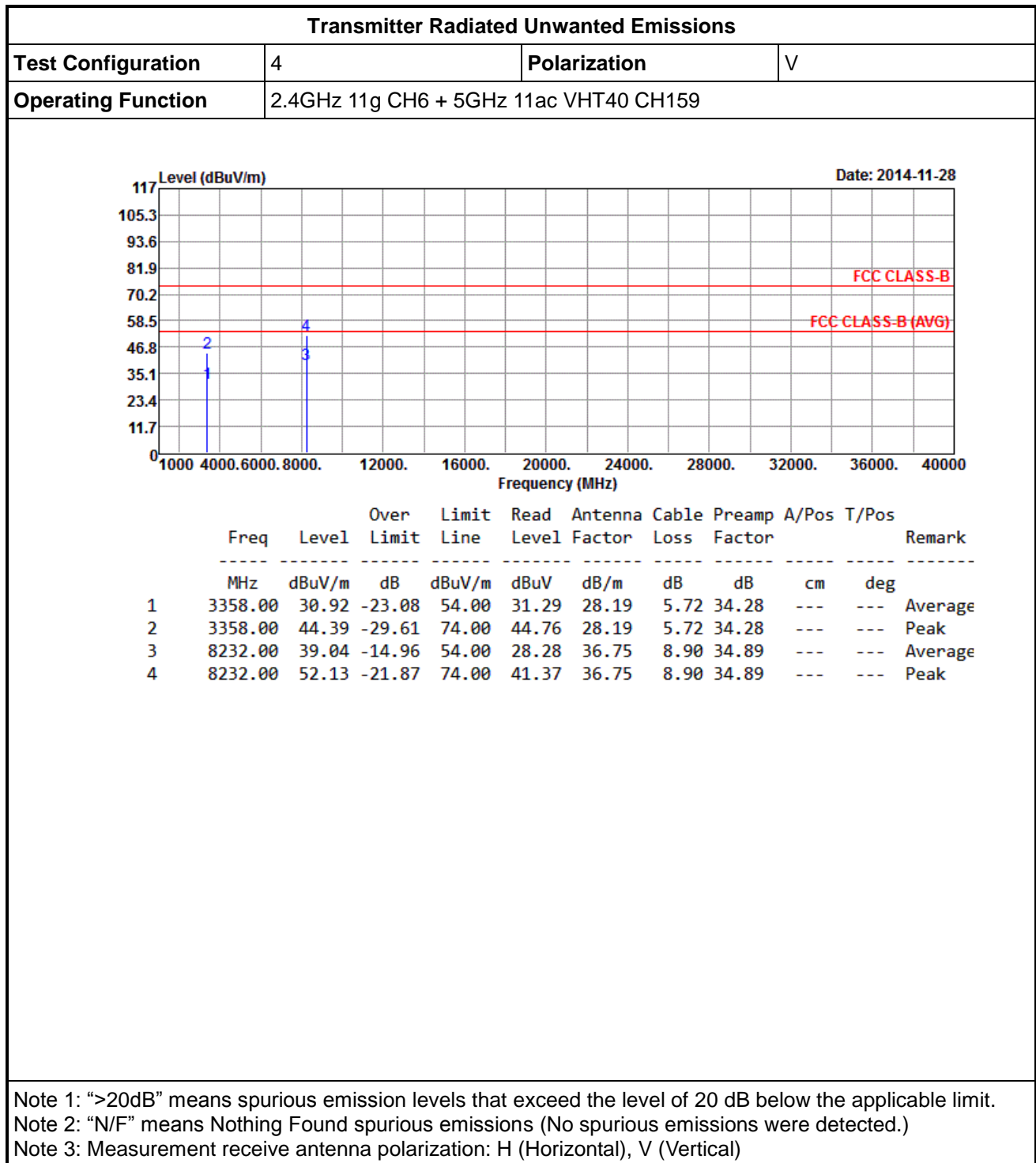












4 TEST EQUIPMENT AND CALIBRATION DATA

Test Item	Radiated Emissions				
Test Site	966 chamber1 / (03CH03-HY)				
Tested Date	Nov. 28, 2014				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum	R&S	FSP40	100004	Mar. 27, 2014	Mar. 26, 2015
Bilog Antenna	SCHAFFNER	CBL 6112D	22237	Sep. 20, 2014	Sep. 19, 2015
Horn Antenna 1G-18G	EMCO	3115	6741	Jun. 11, 2014	Jun. 10, 2015
Horn Antenna 18G-40G	SCHWARZBECK	BBHA9170	BBHA9170154	Jan. 10, 2014	Jan. 09, 2015
Amplifier	HP	8447D	2944A08033	May 05, 2014	May 04, 2015
Amplifier	Agilent	8449B	3008A02120	Sep. 01, 2014	Aug. 31, 2015
RF Cable-R03m	Jye Bao	RG142	CB021	Nov. 15, 2014	Nov. 14, 2015
RF Cable-high	SUHNER	SUCOFLEX 106	03CH03-HY	Dec. 11, 2013	Dec. 10, 2014
Note: Calibration Interval of instruments listed above is one year.					

Loop Antenna	TESEQ	HLA 6120	31244	Dec. 02, 2012	Dec. 01, 2014
Amplifier	EM	EM18G40G	060604	Oct. 17, 2013	Oct. 16, 2015
Note: Calibration Interval of instruments listed above is two year.					