

4.4. 6dB Spectrum Bandwidth Measurement

4.4.1. Limit

For digital modulation systems, the minimum 6dB bandwidth shall be at least 500 kHz.

4.4.2. Measuring Instruments and Setting

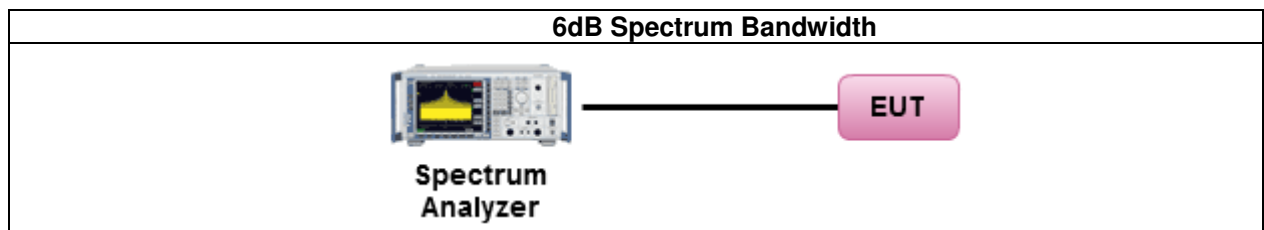
The following table is the setting of the spectrum analyzer.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> 6dB Bandwidth
RBW	1-5 % of the emission bandwidth (EBW)
VBW	$\geq 3 \times \text{RBW}$
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.4.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer in peak hold mode.
2. The resolution bandwidth of 1-5 % of the emission bandwidth (EBW) and the video bandwidth of $\geq 3 \times \text{RBW}$ were used.
3. Measured the spectrum width with power higher than 6d account by this measurement.

4.4.4. Test Setup Layout



4.4.5. Test Deviation

There is no deviation with the original standard.

4.4.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.4.7. Test Result of 6dB Spectrum Bandwidth

For Non-Beamforming

Test date	Feb. 13, 2014	Test Site No.	TH01-CB
Temperature	26°C	Humidity	63%
Test Engineer	Wen Chao	Configuration	802.11a

Configuration IEEE 802.11a

<Ant. 1>

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
149	5745 MHz	16.32	20.64	500	Complies
157	5785 MHz	16.32	20.96	500	Complies
165	5825 MHz	16.32	21.52	500	Complies

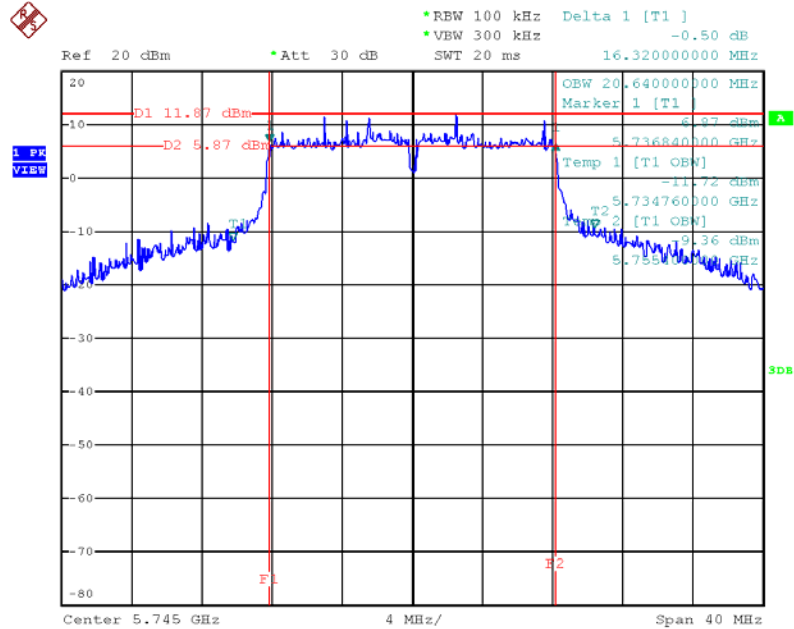
<Ant. 1+2+3, CDD>

Channel	Frequency	6dB Bandwidth (MHz)			99% Occupied Bandwidth (MHz)			Min. Limit (kHz)	Test Result
		Ant. 1	Ant. 2	Ant. 3	Ant. 1	Ant. 2	Ant. 3		
149	5745 MHz	16.32	16.32	16.32	18.24	17.04	18.08	500	Complies
157	5785 MHz	16.32	16.32	16.32	20.32	16.96	18.00	500	Complies
165	5825 MHz	16.32	16.32	16.24	19.68	16.88	22.08	500	Complies

For Non-Beamforming

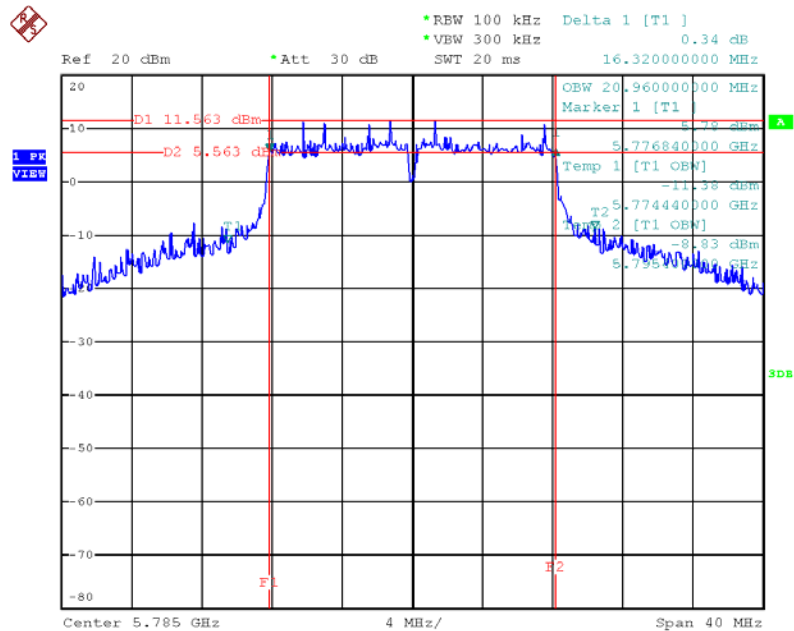
For <Ant. 1>

6 dB Bandwidth Plot on Configuration IEEE 802.11a / CH 149 / Ant. 1



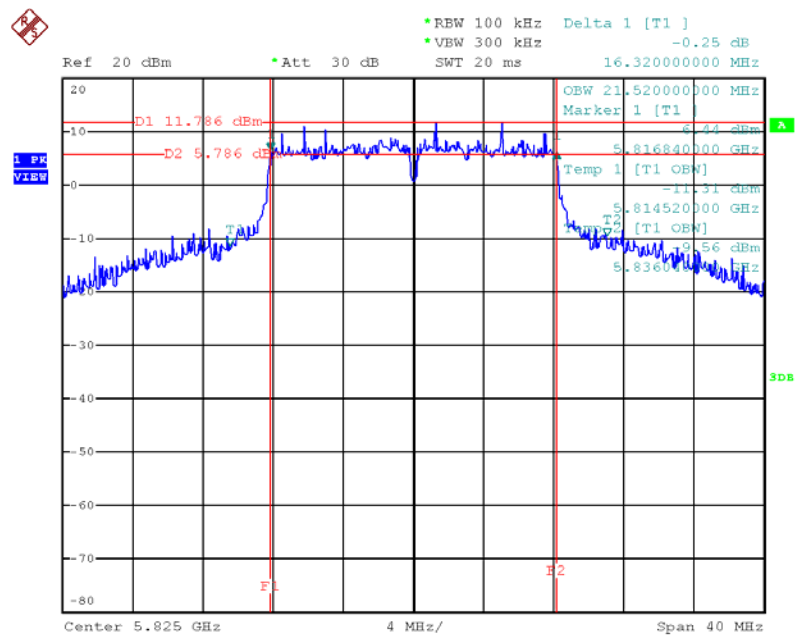
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6 dB Bandwidth Plot on Configuration IEEE 802.11a / CH 157 / Ant. 1



Date: 10.FEB.2014 19:51:43

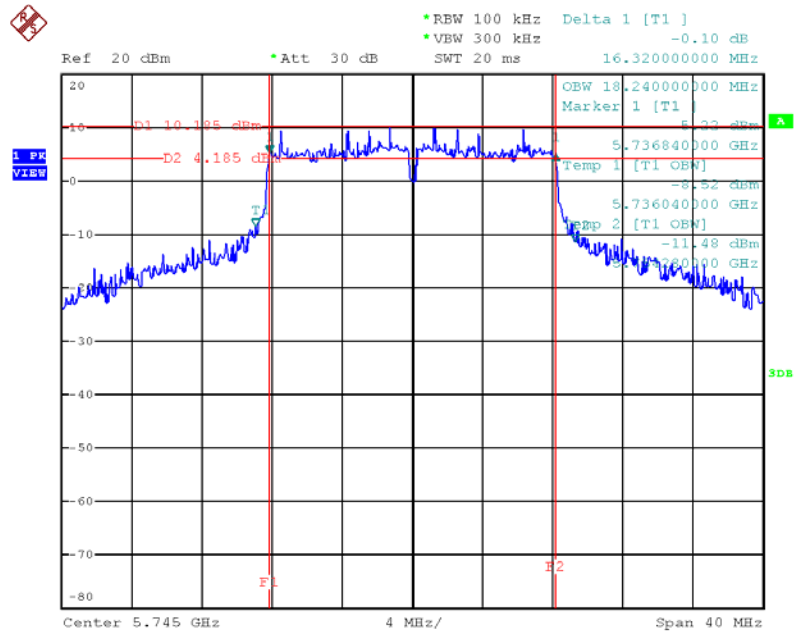
6 dB Bandwidth Plot on Configuration IEEE 802.11a / CH 165 / Ant. 1



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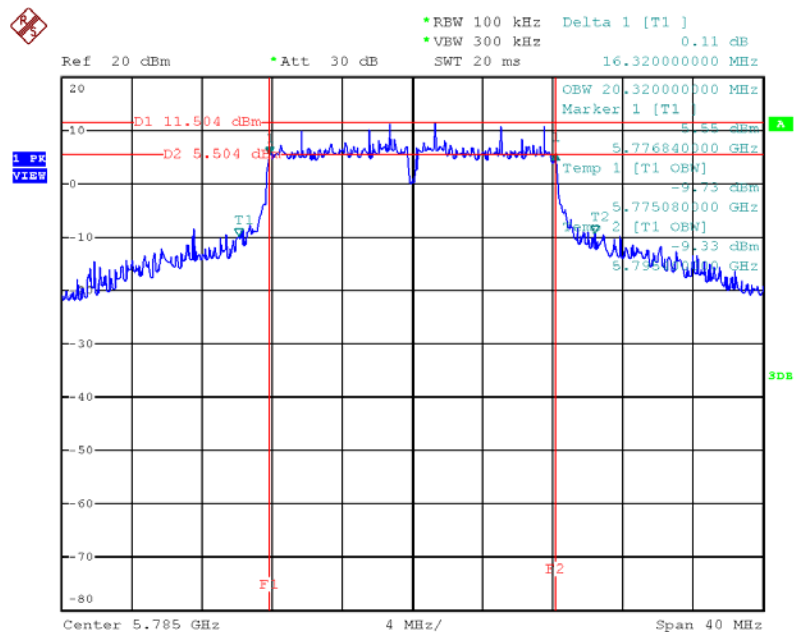
For <Ant. 1+2+3, CDD>

6 dB Bandwidth Plot on Configuration IEEE 802.11a / CH 149 / Ant. 1



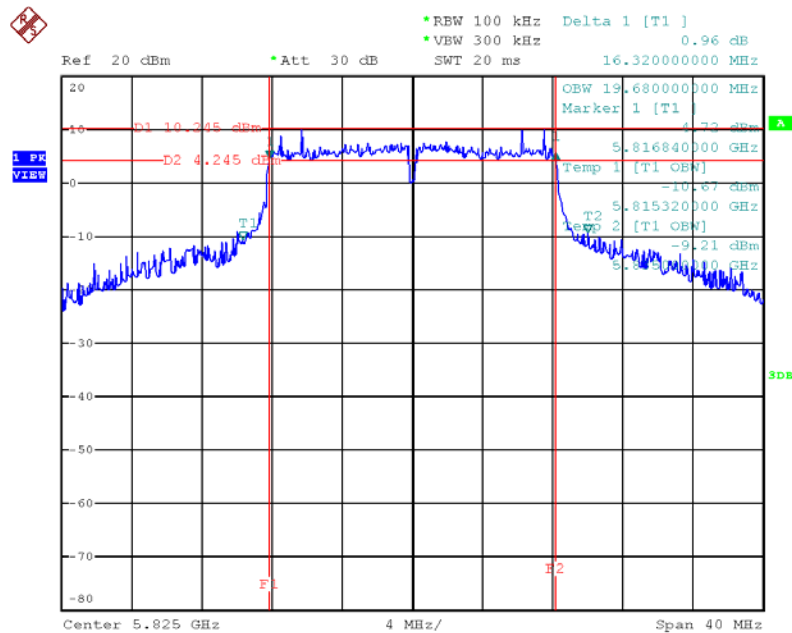
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6 dB Bandwidth Plot on Configuration IEEE 802.11a / CH 157 / Ant. 1



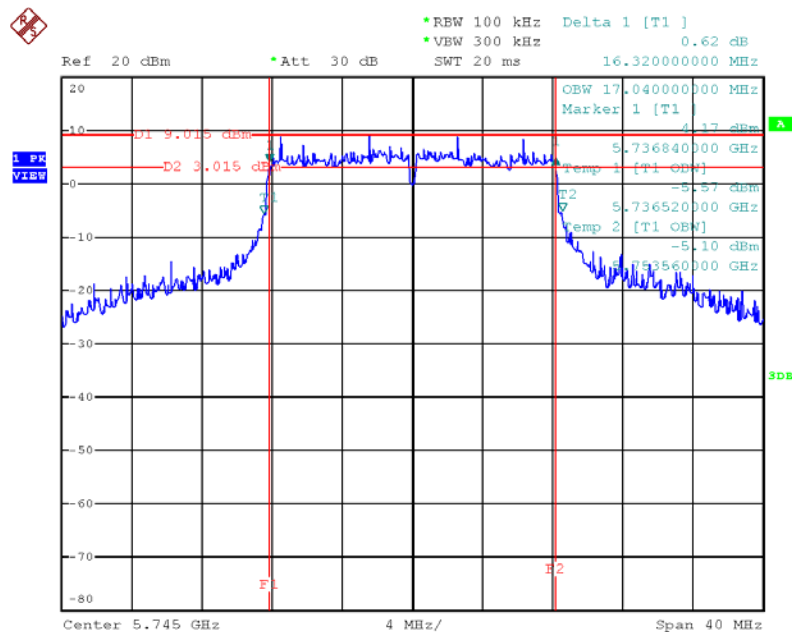
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6 dB Bandwidth Plot on Configuration IEEE 802.11a / CH 165 / Ant. 1



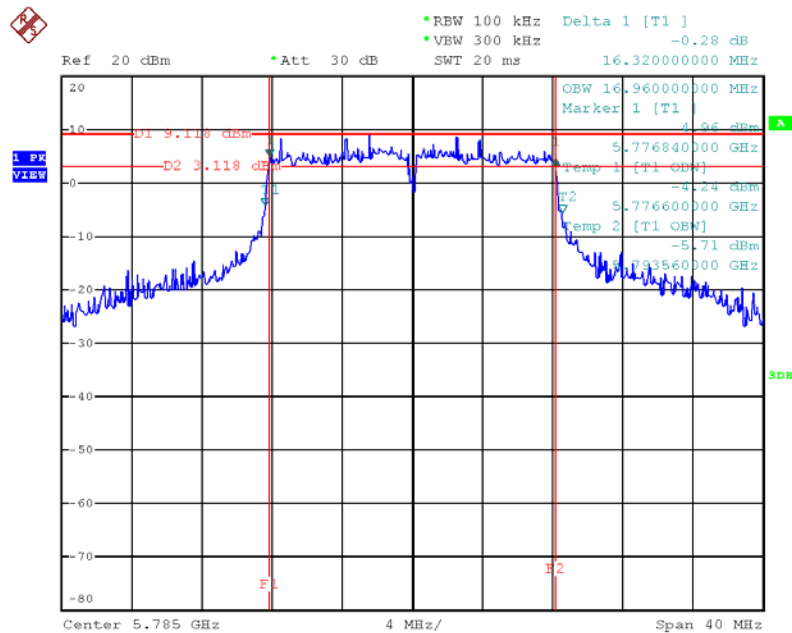
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6 dB Bandwidth Plot on Configuration IEEE 802.11a / CH 149 / Ant. 2



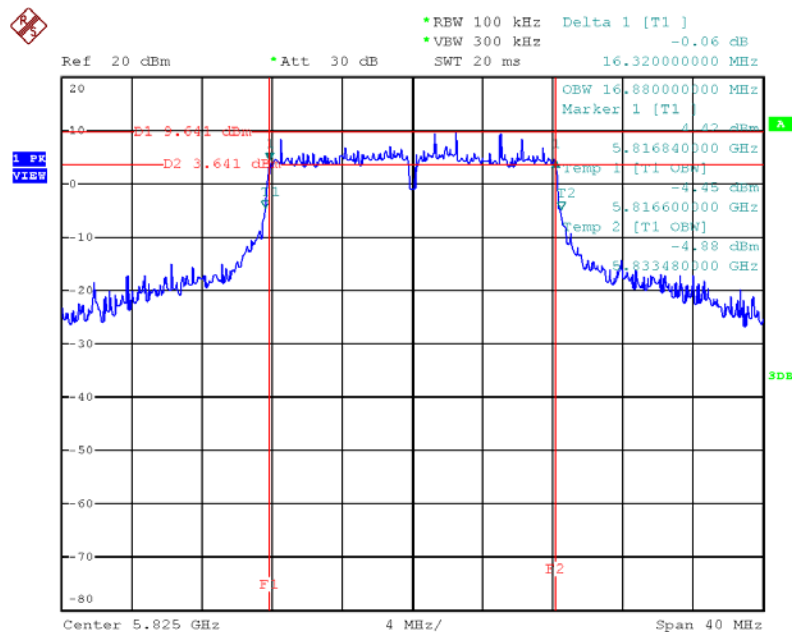
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6 dB Bandwidth Plot on Configuration IEEE 802.11a / CH 157 / Ant. 2



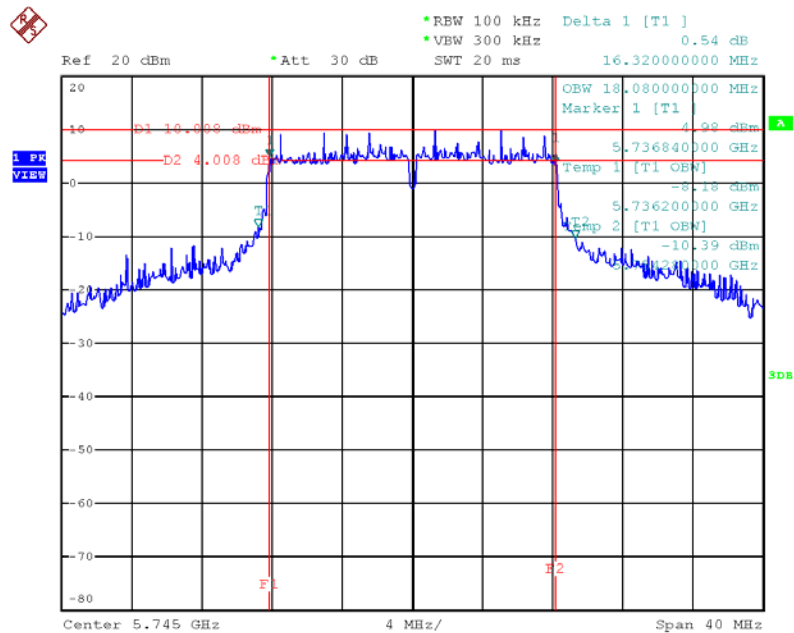
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6 dB Bandwidth Plot on Configuration IEEE 802.11a / CH 165 / Ant. 2



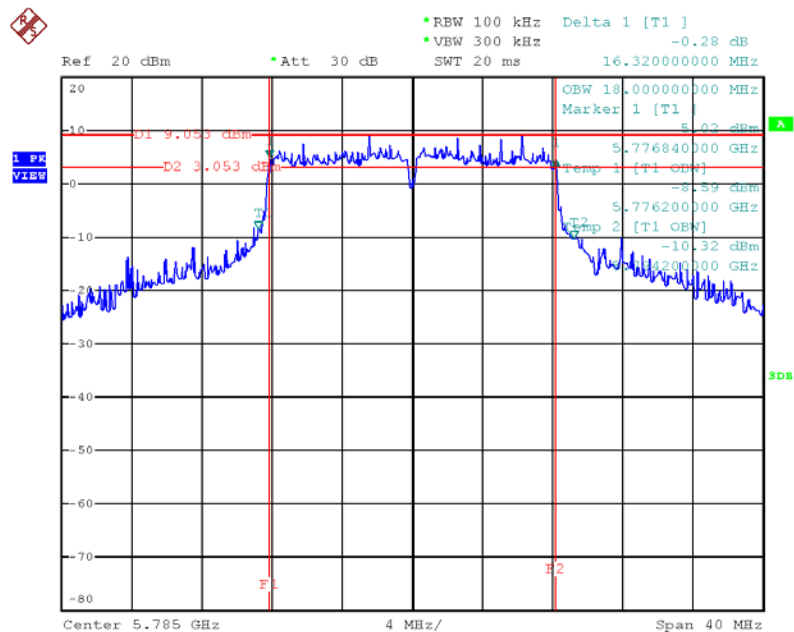
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6 dB Bandwidth Plot on Configuration IEEE 802.11a / CH 149 / Ant. 3



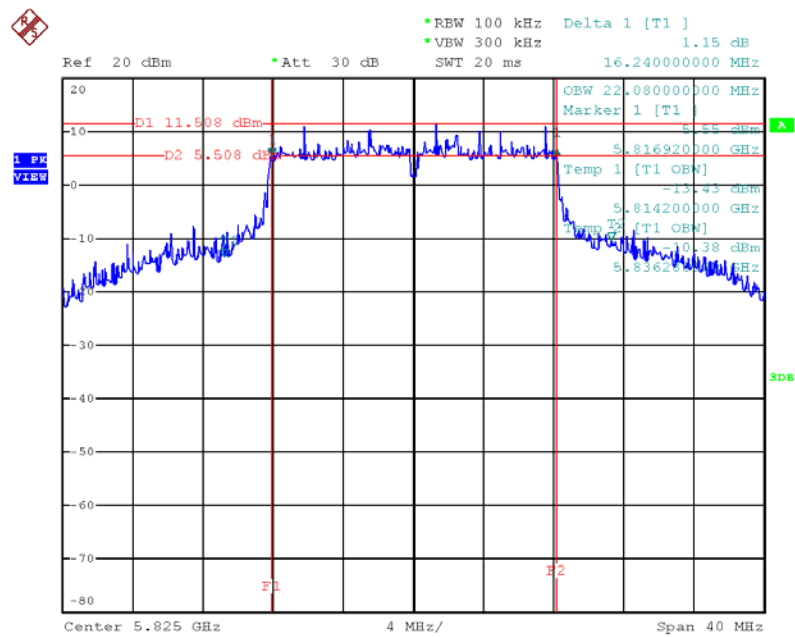
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6 dB Bandwidth Plot on Configuration IEEE 802.11a / CH 157 / Ant. 3



Date: 10.FEB.2014 20:03:16

6 dB Bandwidth Plot on Configuration IEEE 802.11a / CH 165 / Ant. 3



Date: 10.FEB.2014 19:59:59

Test date	Feb. 13, 2014	Test Site No.	TH01-CB
Temperature	26°C	Humidity	63%
Test Engineer	Wen Chao	Configuration	802.11ac 20MHz

Configuration IEEE 802.11ac 20MHz

<Nss1MCS0, Ant. 1>

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
149	5745 MHz	17.60	21.20	500	Complies
157	5785 MHz	17.28	21.76	500	Complies
165	5825 MHz	17.60	21.68	500	Complies

<Nss1MCS0, Ant. 1+2+3>

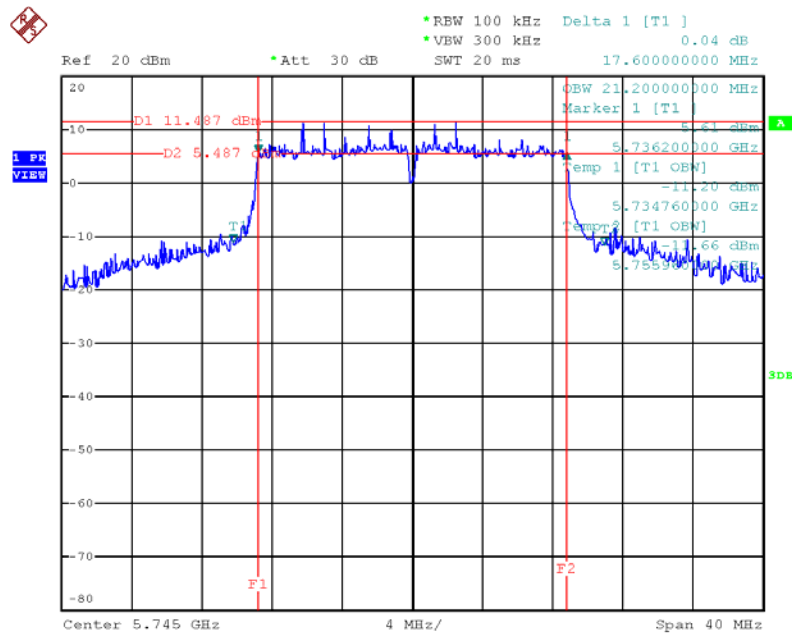
Channel	Frequency	6dB Bandwidth (MHz)			99% Occupied Bandwidth (MHz)			Min. Limit (kHz)	Test Result
		Ant. 1	Ant. 2	Ant. 3	Ant. 1	Ant. 2	Ant. 3		
149	5745 MHz	17.60	17.60	17.60	21.84	17.92	20.80	500	Complies
157	5785 MHz	17.12	17.60	17.60	22.24	17.92	21.92	500	Complies
165	5825 MHz	17.60	17.60	17.60	21.52	17.92	24.00	500	Complies

<Nss2MCS0, Ant. 1+2+3>

Channel	Frequency	6dB Bandwidth (MHz)			99% Occupied Bandwidth (MHz)			Min. Limit (kHz)	Test Result
		Ant. 1	Ant. 2	Ant. 3	Ant. 1	Ant. 2	Ant. 3		
149	5745 MHz	17.60	17.60	17.60	19.84	17.84	18.56	500	Complies
157	5785 MHz	17.60	17.60	17.60	20.40	17.92	19.04	500	Complies
165	5825 MHz	17.60	17.60	17.68	20.56	17.92	18.80	500	Complies

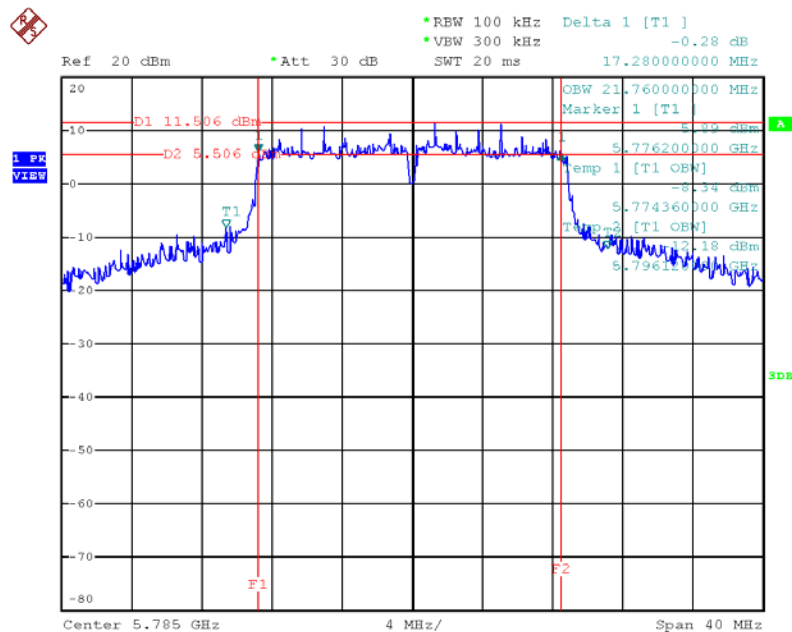
For <Nss1MCS0, Ant. 1>

6 dB Bandwidth Plot on Configuration IEEE 802.11ac 20MHz Nss1MCS0 / CH 149 / Ant. 1



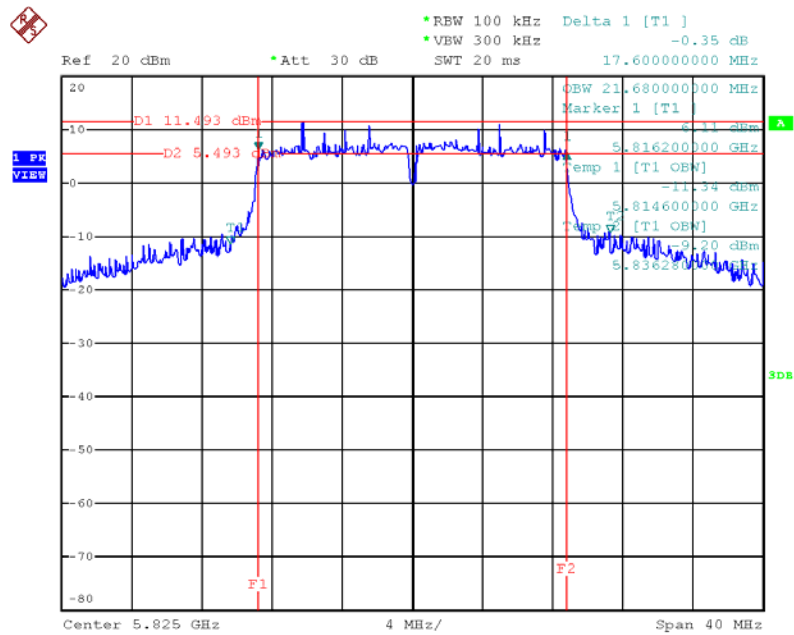
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6 dB Bandwidth Plot on Configuration IEEE 802.11ac 20MHz Nss1MCS0 / CH 157 / Ant. 1



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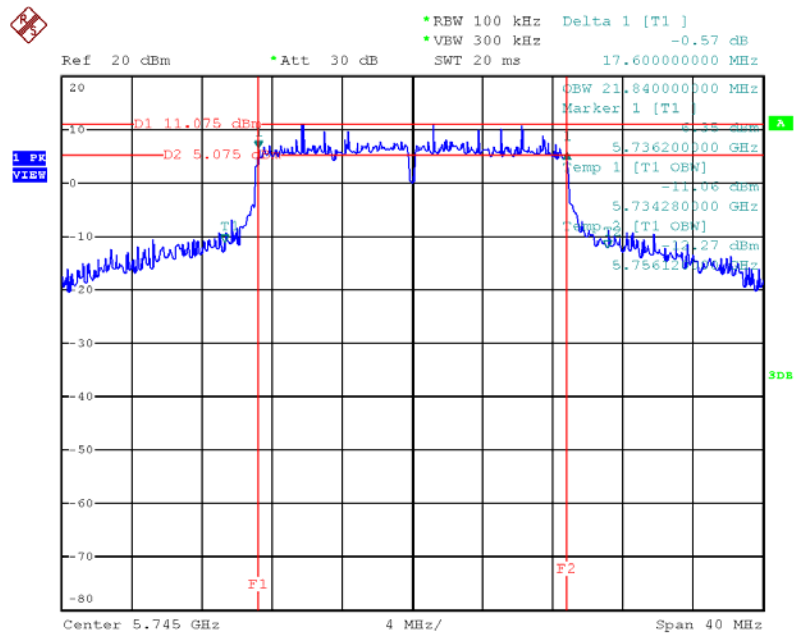
6 dB Bandwidth Plot on Configuration IEEE 802.11ac 20MHz Nss1MCS0 / CH 165 / Ant. 1



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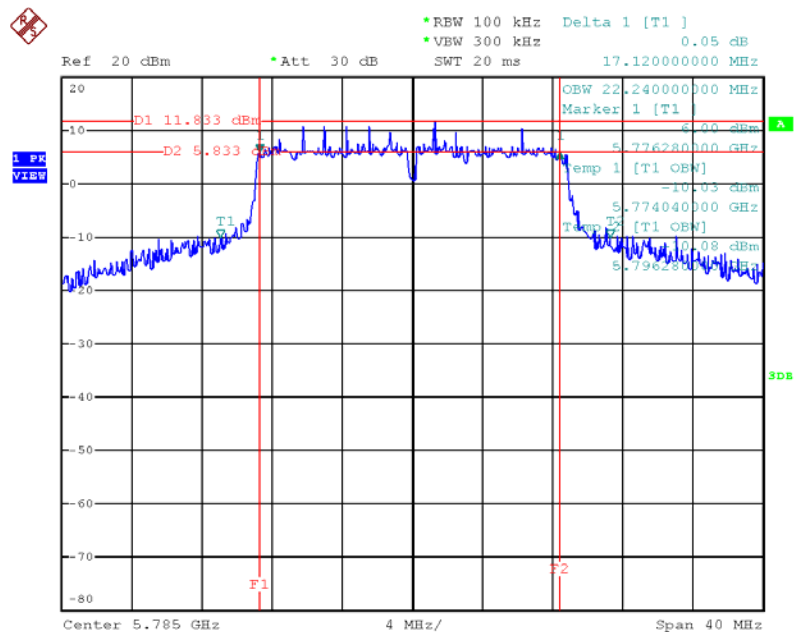
For <Nss1MCS0, Ant. 1+2+3>

6 dB Bandwidth Plot on Configuration IEEE 802.11ac 20MHz Nss1MCS0 / CH 149 / Ant. 1



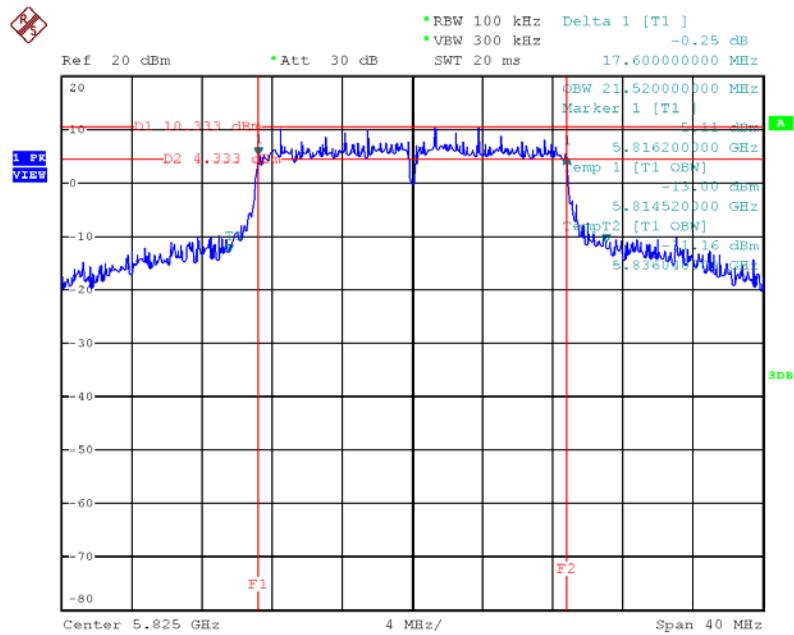
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6 dB Bandwidth Plot on Configuration IEEE 802.11ac 20MHz Nss1MCS0 / CH 157 / Ant. 1



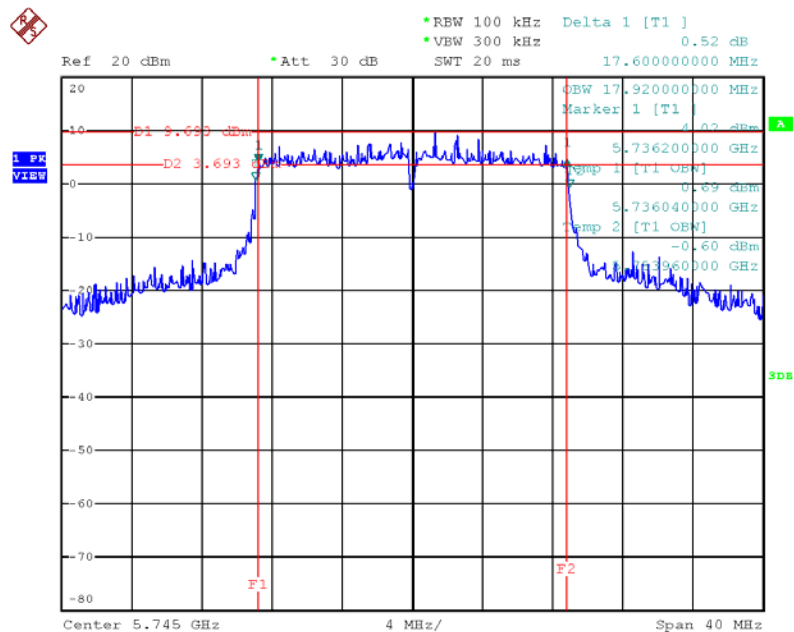
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6 dB Bandwidth Plot on Configuration IEEE 802.11ac 20MHz Nss1MCS0 / CH 165 / Ant. 1



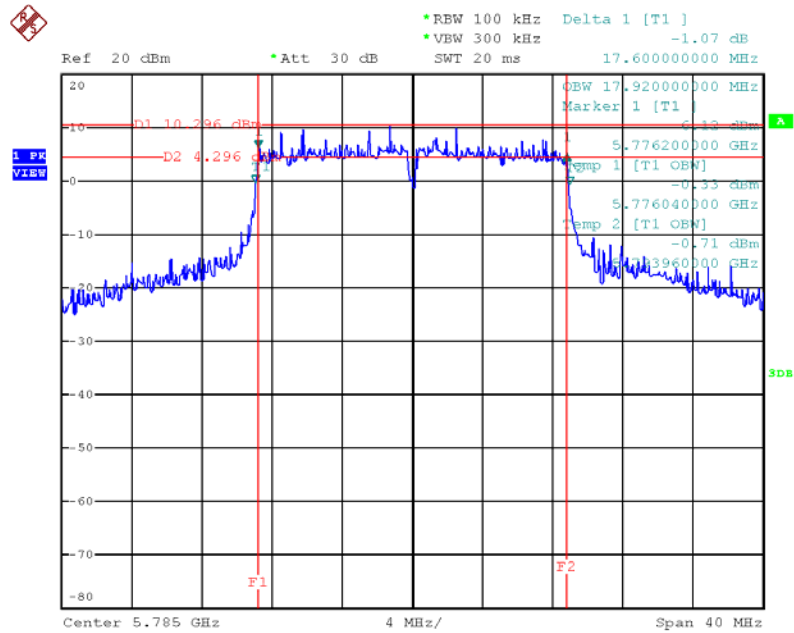
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6 dB Bandwidth Plot on Configuration IEEE 802.11ac 20MHz Nss1MCS0 / CH 149 / Ant. 2



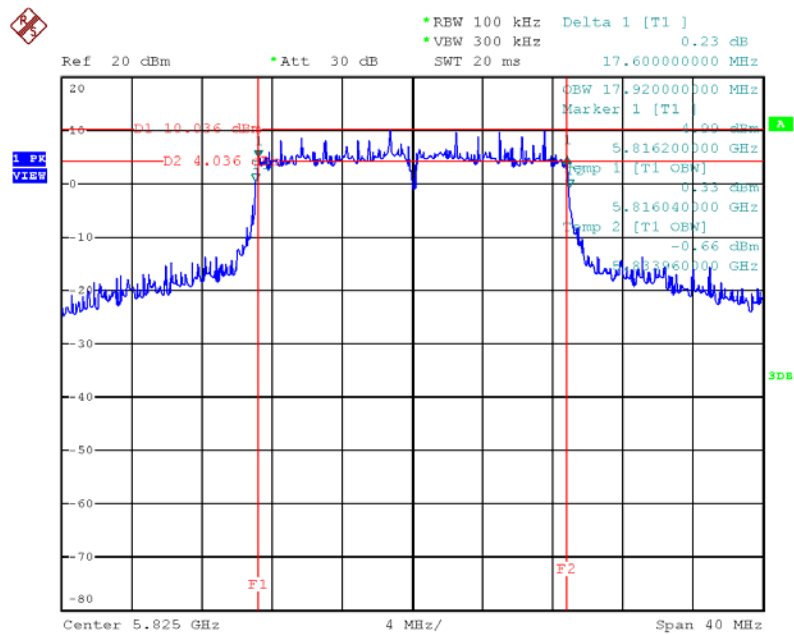
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6 dB Bandwidth Plot on Configuration IEEE 802.11ac 20MHz Nss1MCS0 / CH 157 / Ant. 2



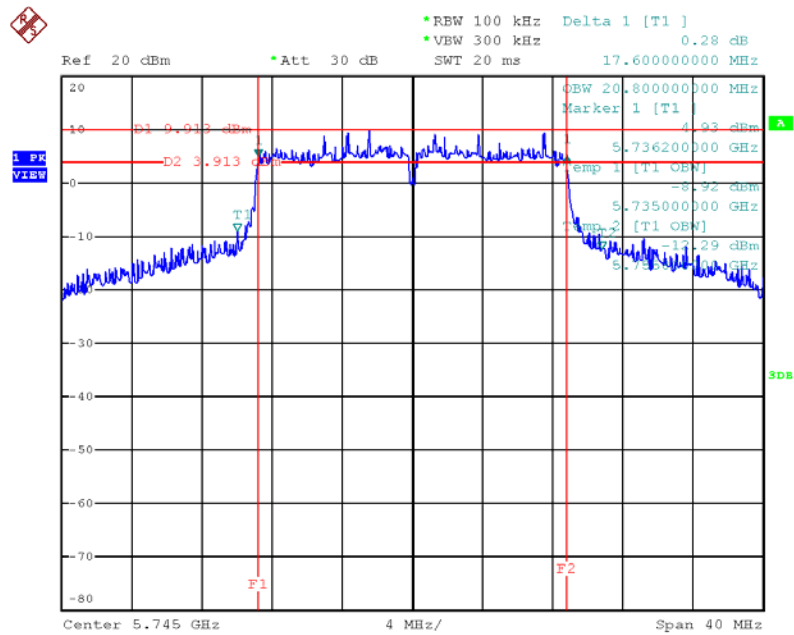
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6 dB Bandwidth Plot on Configuration IEEE 802.11ac 20MHz Nss1MCS0 / CH 165 / Ant. 2



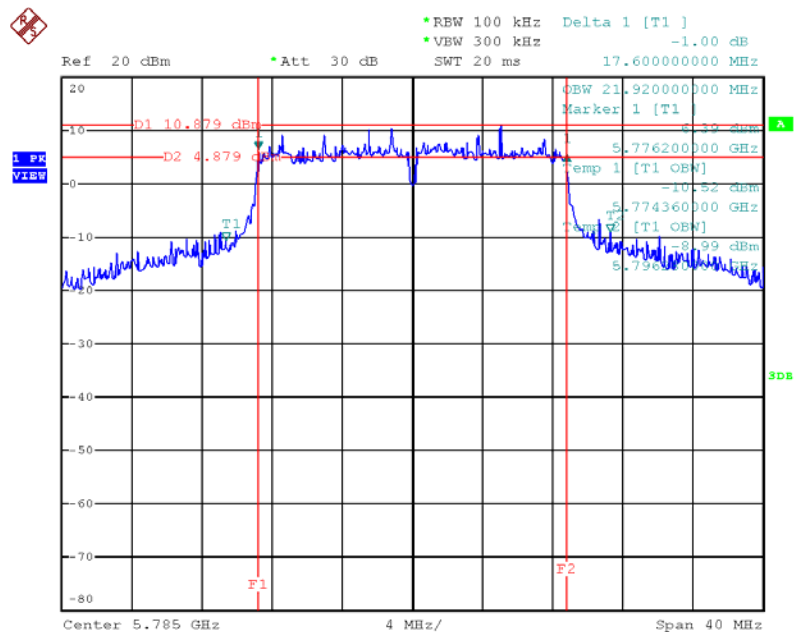
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6 dB Bandwidth Plot on Configuration IEEE 802.11ac 20MHz Nss1MCS0 / CH 149 / Ant. 3



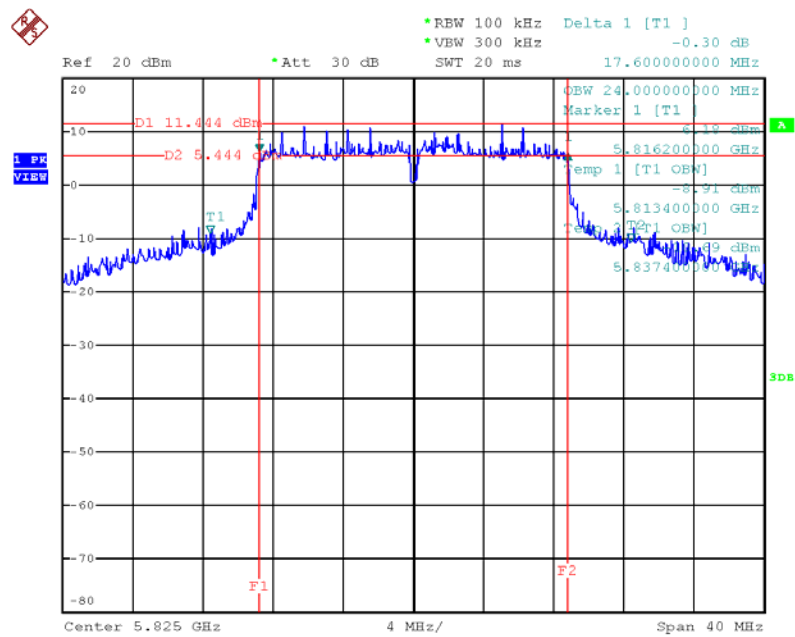
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6 dB Bandwidth Plot on Configuration IEEE 802.11ac 20MHz Nss1MCS0 / CH 157 / Ant. 3



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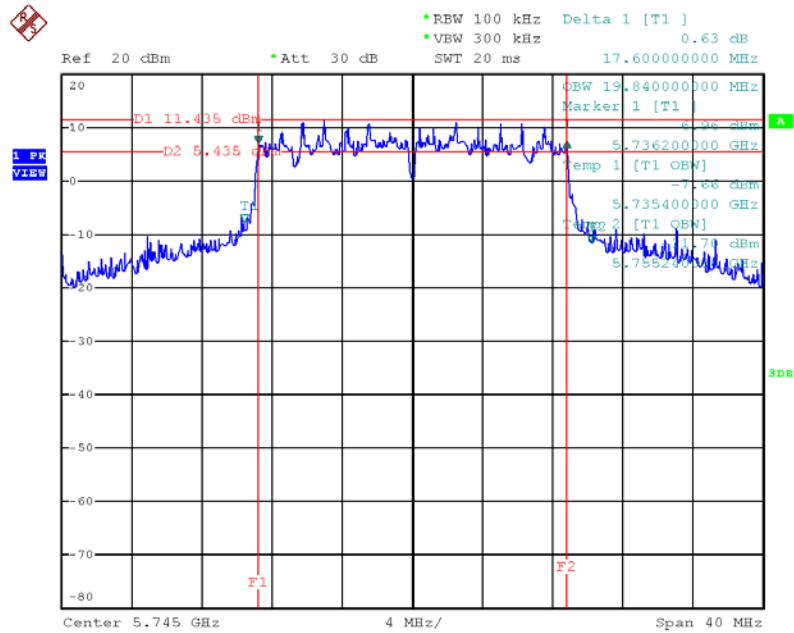
6 dB Bandwidth Plot on Configuration IEEE 802.11ac 20MHz Nss1MCS0 / CH 165 / Ant. 3



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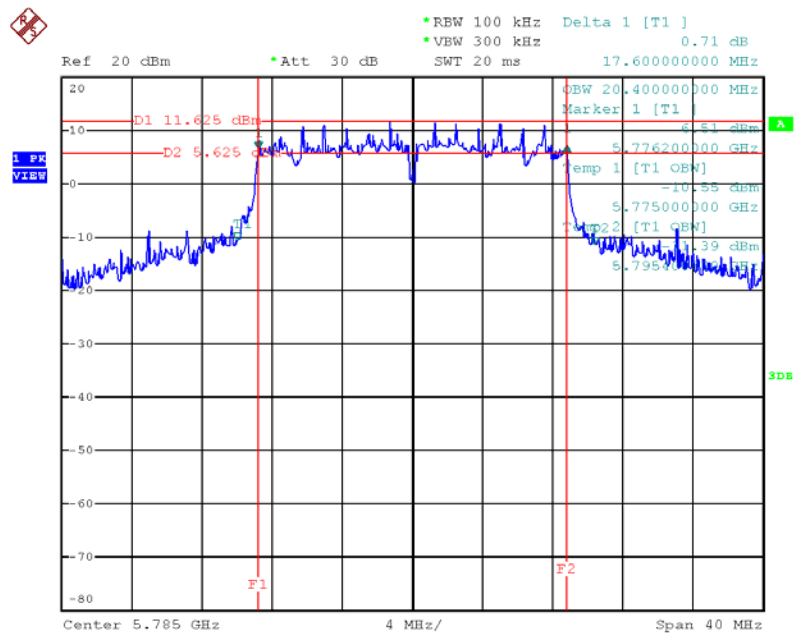
<Nss2MCS0, Ant. 1+2+3>

6 dB Bandwidth Plot on Configuration IEEE 802.11ac 20MHz Nss2MCS0 / CH 149 / Ant. 1



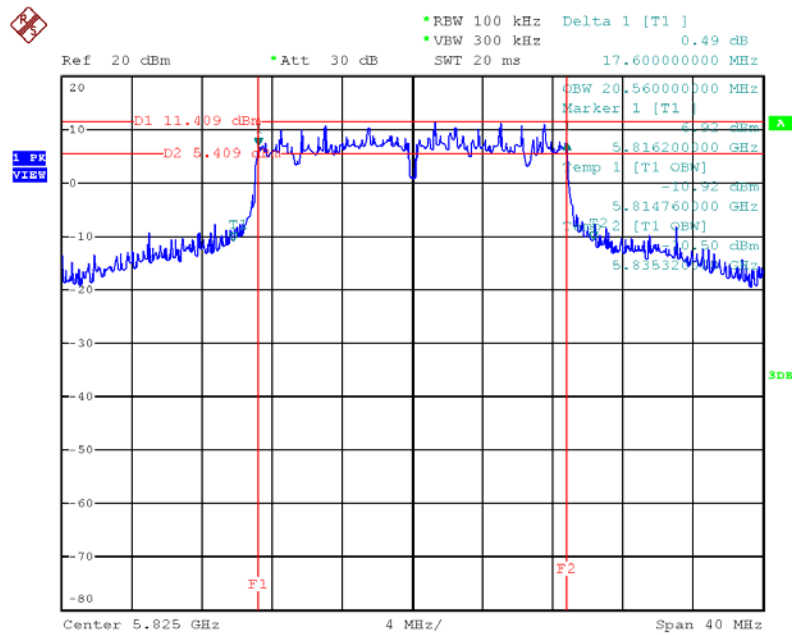
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6 dB Bandwidth Plot on Configuration IEEE 802.11ac 20MHz Nss2MCS0 / CH 157 / Ant. 1



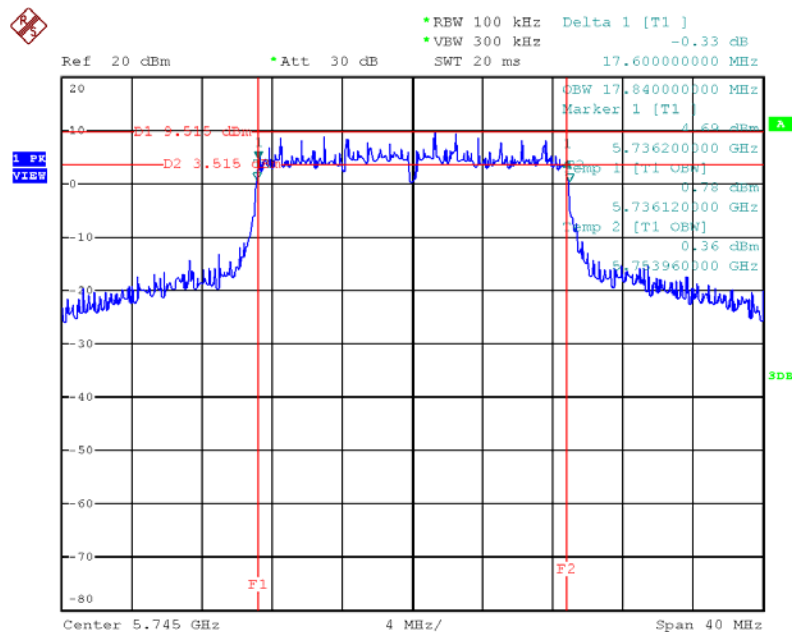
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6 dB Bandwidth Plot on Configuration IEEE 802.11ac 20MHz Nss2MCS0 / CH 165 / Ant. 1



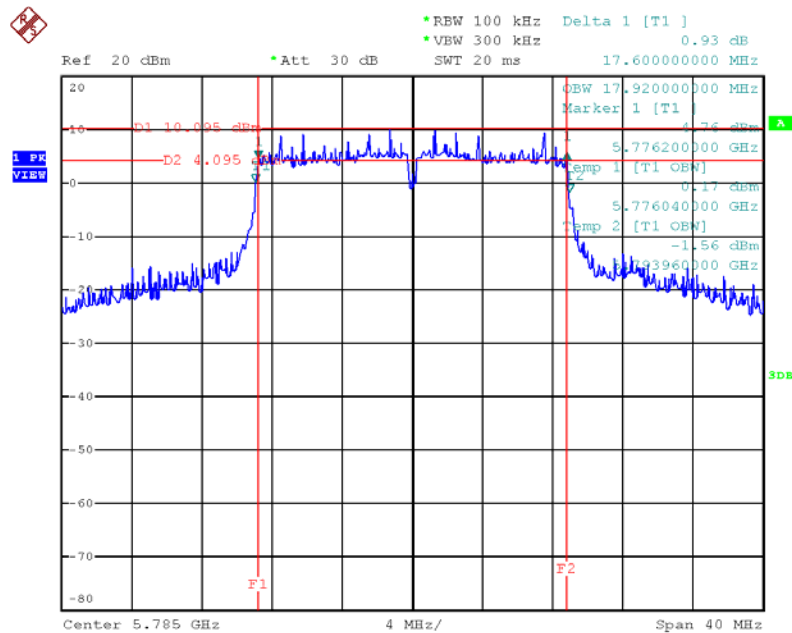
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6 dB Bandwidth Plot on Configuration IEEE 802.11ac 20MHz Nss2MCS0 / CH 149 / Ant. 2



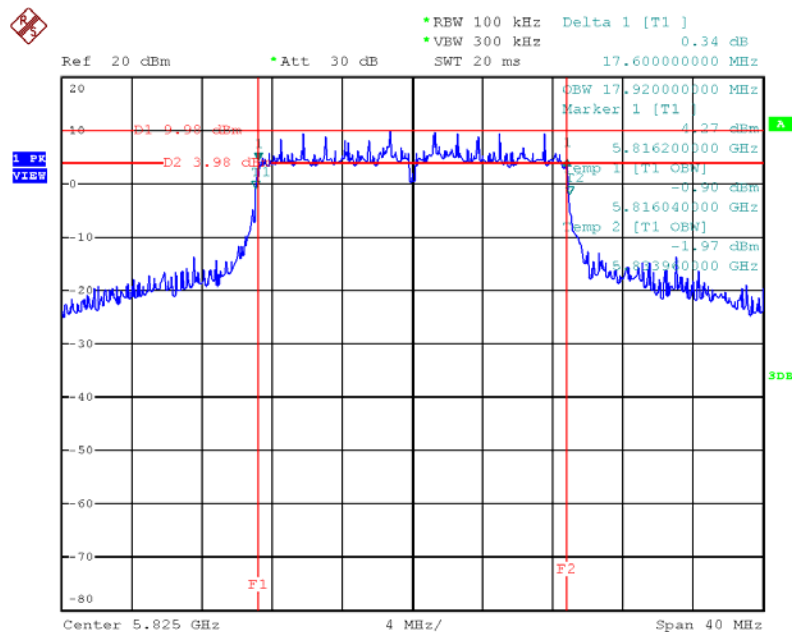
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6 dB Bandwidth Plot on Configuration IEEE 802.11ac 20MHz Nss2MCS0 / CH 157 / Ant. 2



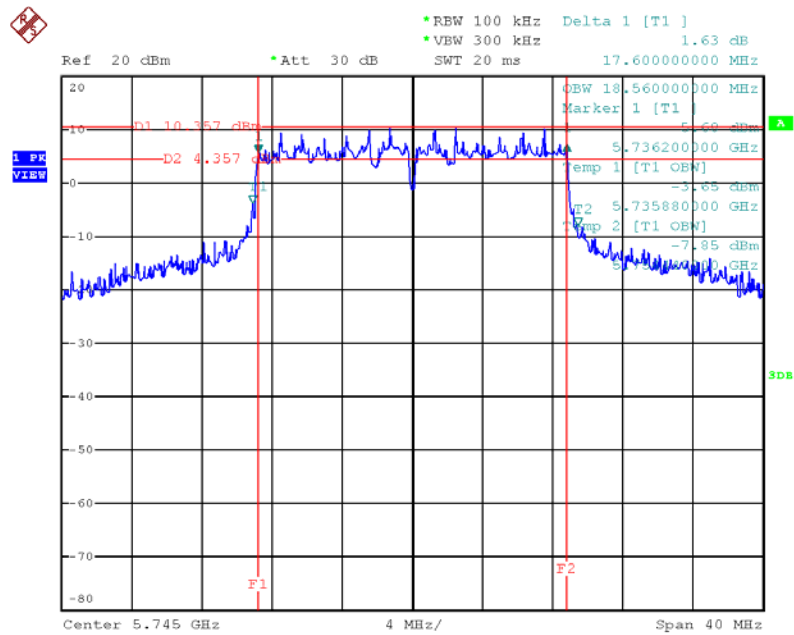
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6 dB Bandwidth Plot on Configuration IEEE 802.11ac 20MHz Nss2MCS0 / CH 165 / Ant. 2



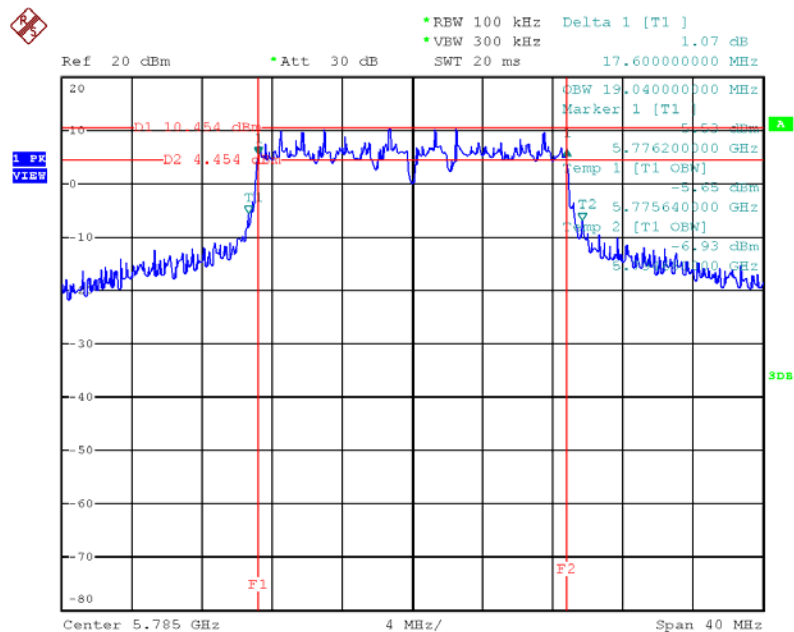
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6 dB Bandwidth Plot on Configuration IEEE 802.11ac 20MHz Nss2MCS0 / CH 149 / Ant. 3



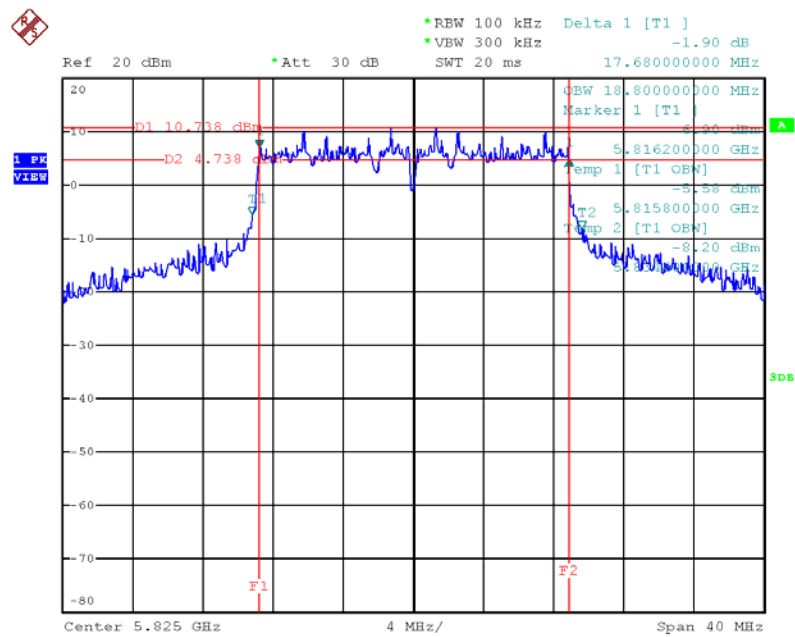
Date: 10.FEB.2014 20:26:20

6 dB Bandwidth Plot on Configuration IEEE 802.11ac 20MHz Nss2MCS0 / CH 157 / Ant. 3



Date: 10.FEB.2014 20:25:45

6 dB Bandwidth Plot on Configuration IEEE 802.11ac 20MHz Nss2MCS0 / CH 165 / Ant. 3



Date: 10.FEB.2014 20:25:14

Test date	Feb. 13, 2014	Test Site No.	TH01-CB
Temperature	26°C	Humidity	63%
Test Engineer	Wen Chao	Configuration	802.11ac 40MHz

Configuration IEEE 802.11ac 40MHz

<Nss1MCS0, Ant. 1>

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
151	5755 MHz	36.32	36.48	500	Complies
159	5795 MHz	35.84	36.80	500	Complies

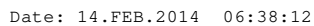
<Nss1MCS0, Ant. 1+2+3>

Channel	Frequency	6dB Bandwidth (MHz)			99% Occupied Bandwidth (MHz)			Min. Limit (kHz)	Test Result
		Ant. 1	Ant. 2	Ant. 3	Ant. 1	Ant. 2	Ant. 3		
151	5755 MHz	36.48	36.32	36.48	36.48	36.48	36.64	500	Complies
159	5795 MHz	36.32	36.32	36.48	36.80	36.32	37.44	500	Complies

<Nss2MCS0, Ant. 1+2+3>

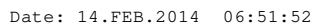
Channel	Frequency	6dB Bandwidth (MHz)			99% Occupied Bandwidth (MHz)			Min. Limit (kHz)	Test Result
		Ant. 1	Ant. 2	Ant. 3	Ant. 1	Ant. 2	Ant. 3		
151	5755 MHz	36.16	36.32	36.16	36.48	36.48	36.32	500	Complies
159	5795 MHz	36.16	36.32	36.32	36.64	36.48	36.64	500	Complies

6 dB Bandwidth Plot on Configuration IEEE 802.11ac 40MHz Nss1MCS0 / CH 151 / Ant. 1



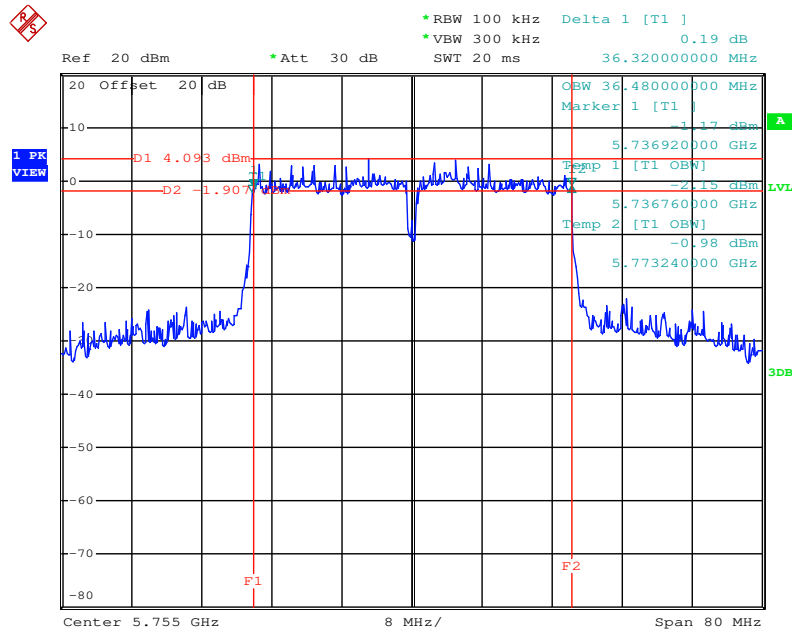
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6 dB Bandwidth Plot on Configuration IEEE 802.11ac 40MHz Nss1MCS0 / CH 151 / Ant. 1



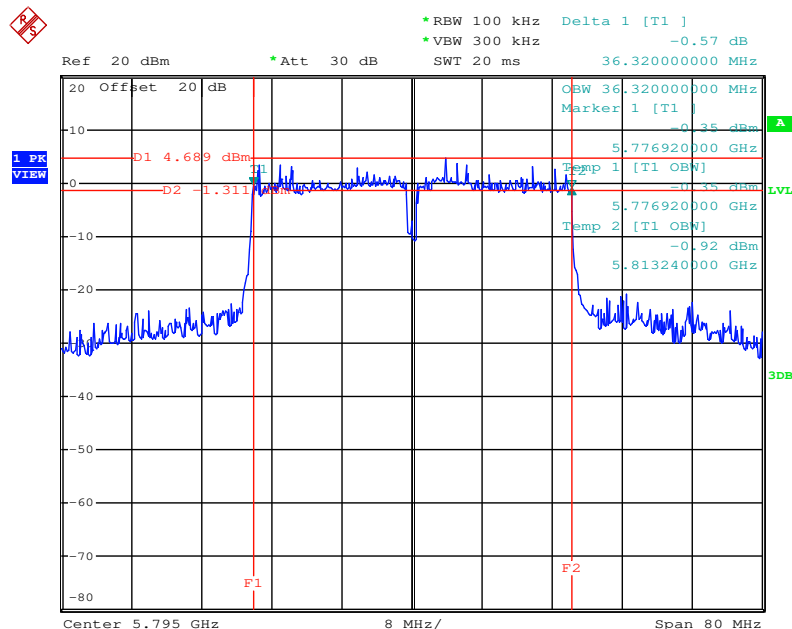
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6 dB Bandwidth Plot on Configuration IEEE 802.11ac 40MHz Nss1MCS0 / CH 151 / Ant. 2



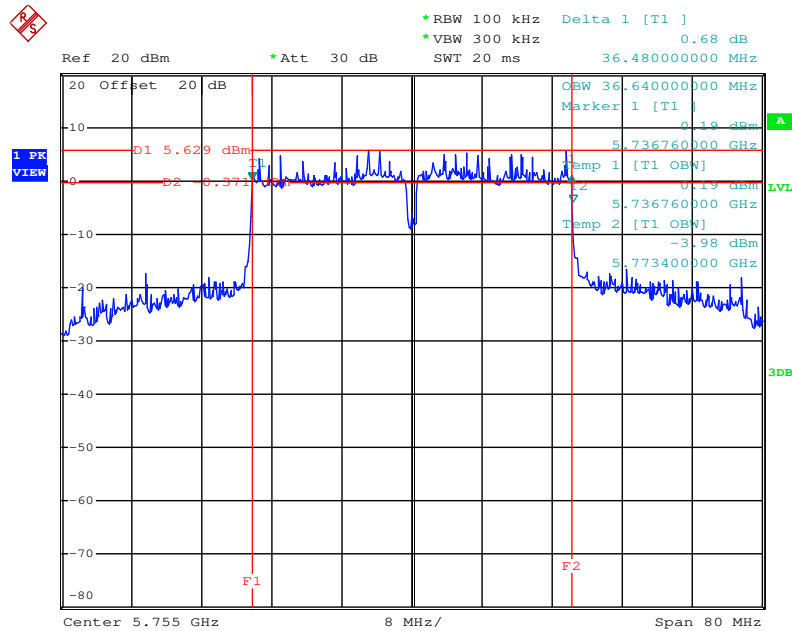
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6 dB Bandwidth Plot on Configuration IEEE 802.11ac 40MHz Nss1MCS0 / CH 159 / Ant. 2



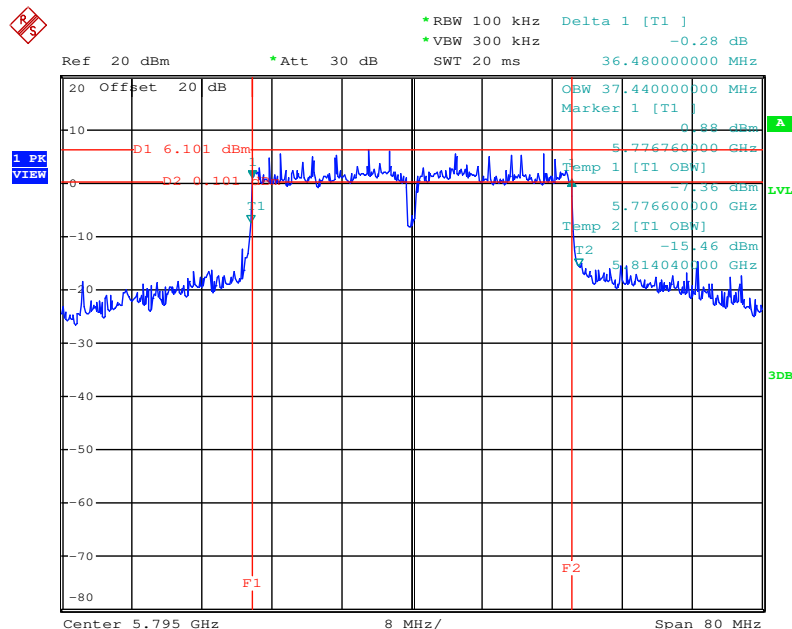
Date: 14.FEB.2014 06:54:51

6 dB Bandwidth Plot on Configuration IEEE 802.11ac 40MHz Nss1MCS0 / CH 151 / Ant. 3



Date: 14.FEB.2014 06:53:16

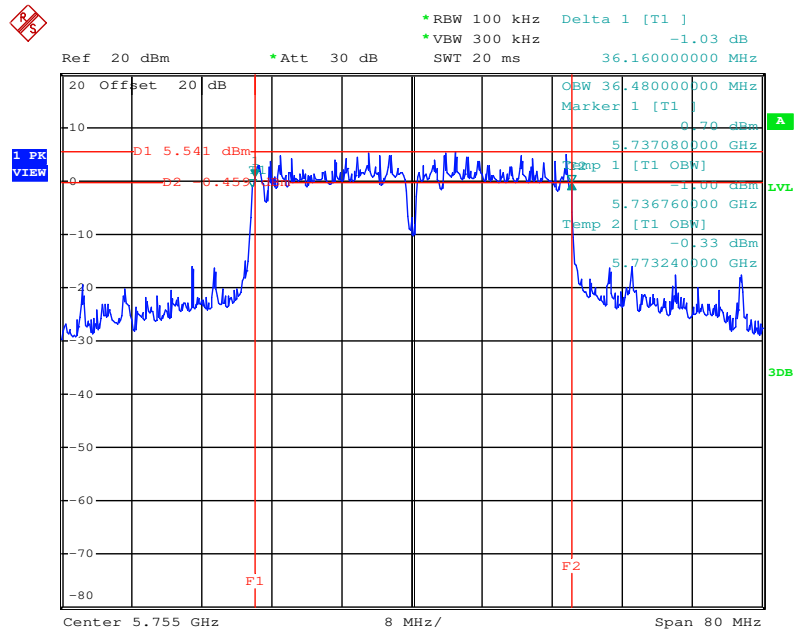
6 dB Bandwidth Plot on Configuration IEEE 802.11ac 40MHz Nss1MCS0 / CH 159 / Ant. 3



Date: 14.FEB.2014 06:54:14

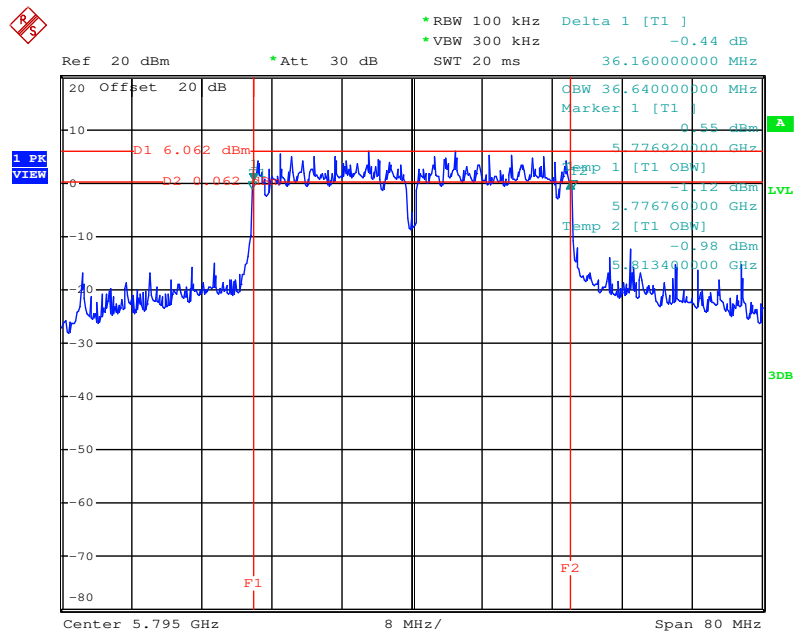
For <Nss2MCS0, Ant. 1+2+3>

6 dB Bandwidth Plot on Configuration IEEE 802.11ac 40MHz Nss2MCS0 / CH 151 / Ant. 1



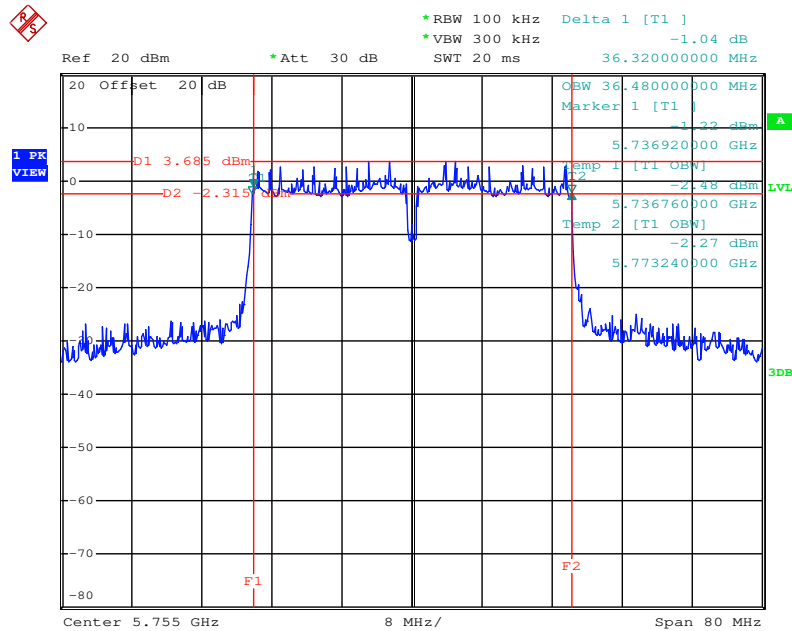
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6 dB Bandwidth Plot on Configuration IEEE 802.11ac 40MHz Nss2MCS0 / CH 159 / Ant. 1



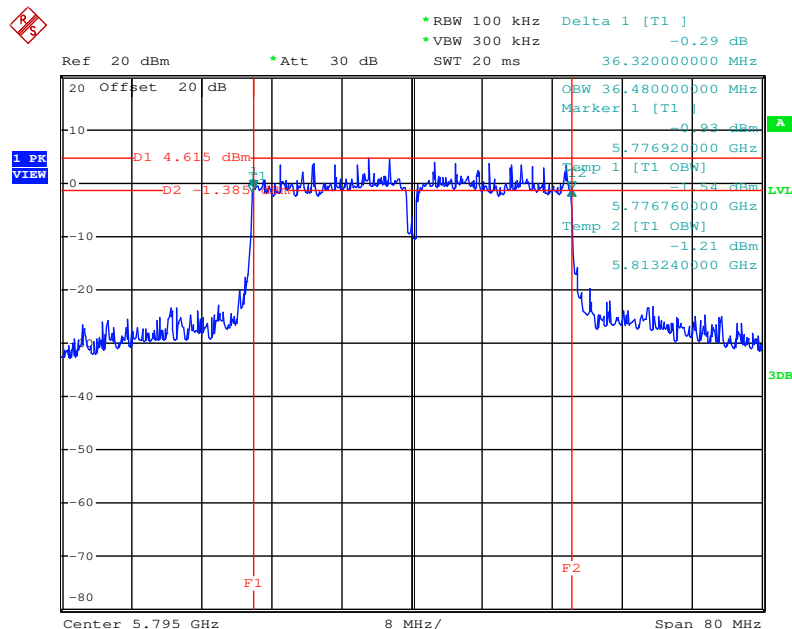
Date: 14.FEB.2014 07:02:05

6 dB Bandwidth Plot on Configuration IEEE 802.11ac 40MHz Nss2MCS0 / CH 151 / Ant. 2



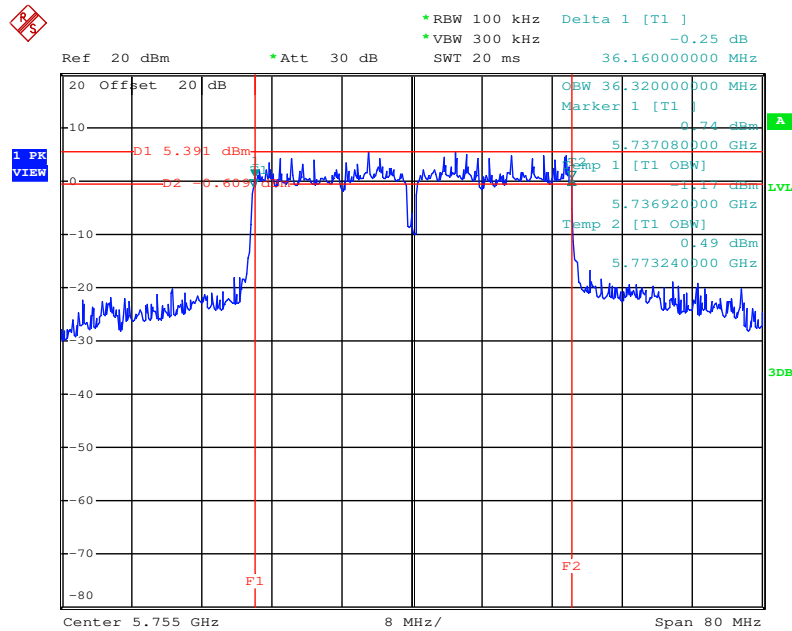
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6 dB Bandwidth Plot on Configuration IEEE 802.11ac 40MHz Nss2MCS0 / CH 159 / Ant. 2



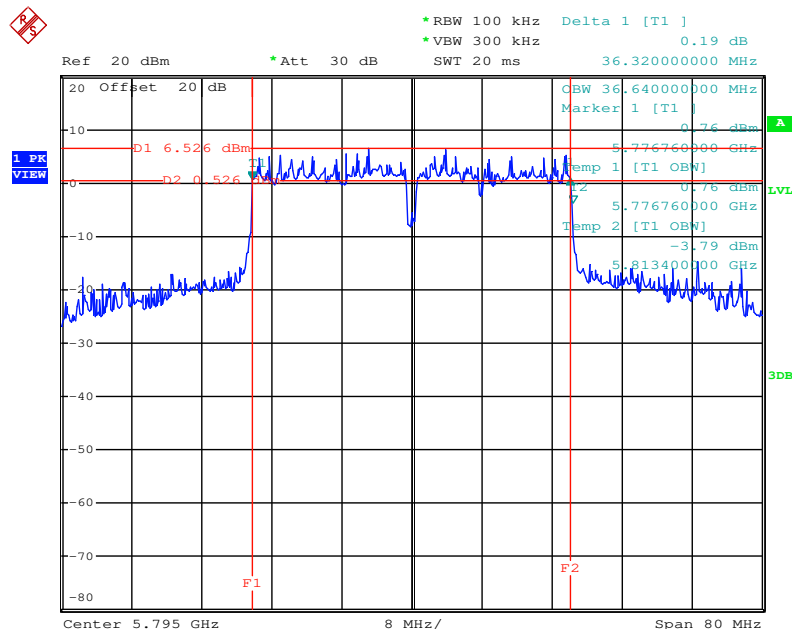
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6 dB Bandwidth Plot on Configuration IEEE 802.11ac 40MHz Nss2MCS0 / CH 151 / Ant. 3



Date: 14.FEB.2014 06:58:59

6 dB Bandwidth Plot on Configuration IEEE 802.11ac 40MHz Nss2MCS0 / CH 159 / Ant. 3



Date: 14.FEB.2014 07:00:34

Test date	Feb. 13, 2014	Test Site No.	TH01-CB
Temperature	26°C	Humidity	63%
Test Engineer	Wen Chao	Configuration	802.11ac 80MHz

Configuration IEEE 802.11ac 80MHz

<Nss1MCS0, Ant. 3>

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
155	5775 MHz	75.52	75.84	500	Complies

<Nss1MCS0, Ant. 1+2+3>

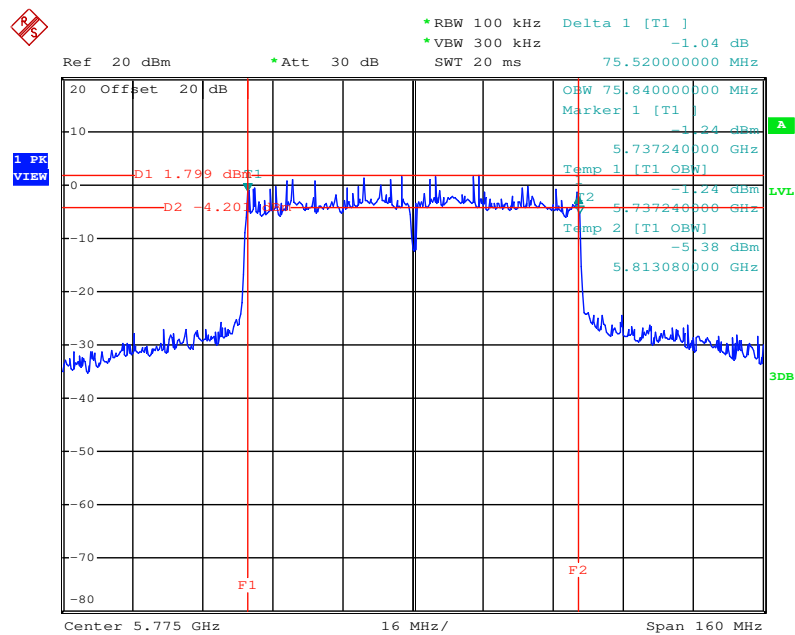
Channel	Frequency	6dB Bandwidth (MHz)			99% Occupied Bandwidth (MHz)			Min. Limit (kHz)	Test Result
		Ant. 1	Ant. 2	Ant. 3	Ant. 1	Ant. 2	Ant. 3		
155	5775 MHz	75.52	75.20	75.52	76.16	75.84	75.84	500	Complies

<Nss2MCS0, Ant. 1+2+3>

Channel	Frequency	6dB Bandwidth (MHz)			99% Occupied Bandwidth (MHz)			Min. Limit (kHz)	Test Result
		Ant. 1	Ant. 2	Ant. 3	Ant. 1	Ant. 2	Ant. 3		
155	5775 MHz	75.84	75.84	75.52	75.84	75.84	75.84	500	Complies

For <Nss1MCS0, Ant. 3>

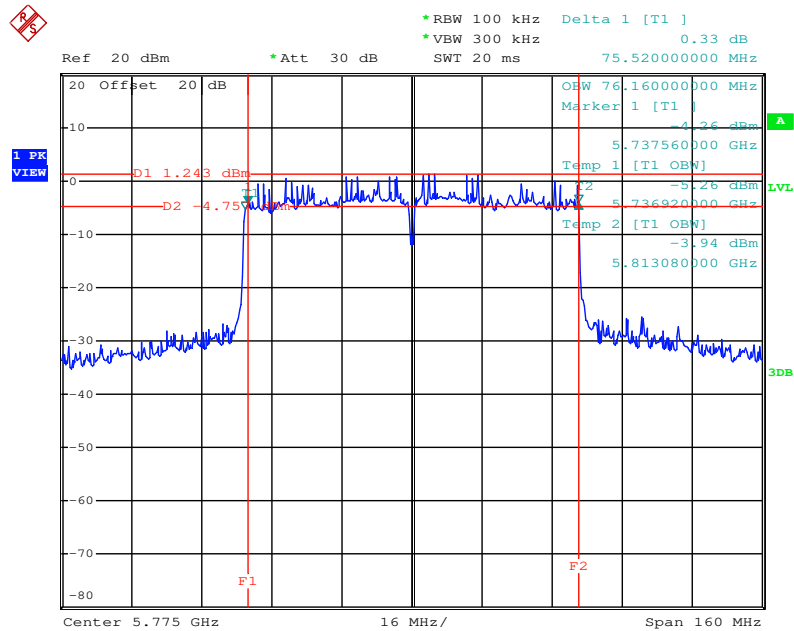
Power Density Plot on Configuration IEEE 802.11ac 80MHz Nss1MCS0 / CH 155 / Ant. 3



Date: 14.FEB.2014 07:08:45

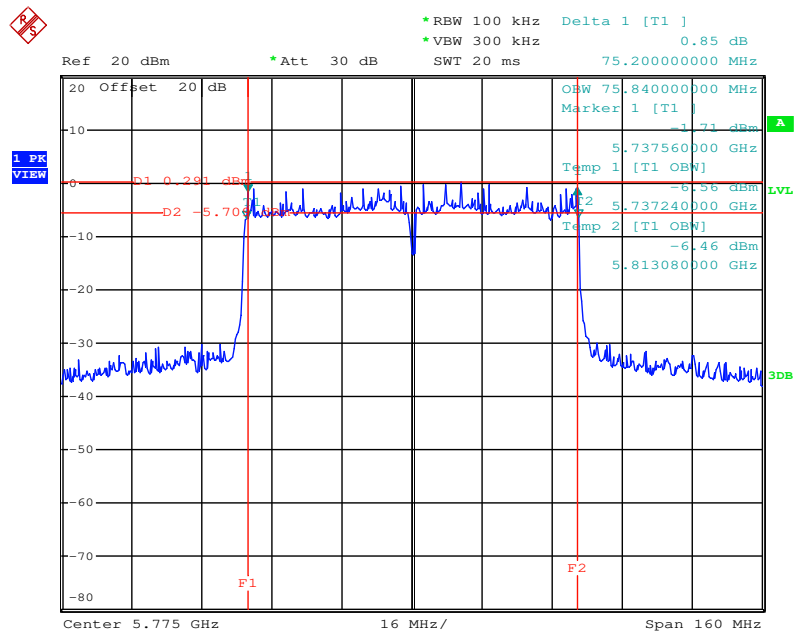
For <Nss1MCS0, Ant. 1+2+3>

Power Density Plot on Configuration IEEE 802.11ac 80MHz Nss1MCS0 / CH 155 / Ant. 1



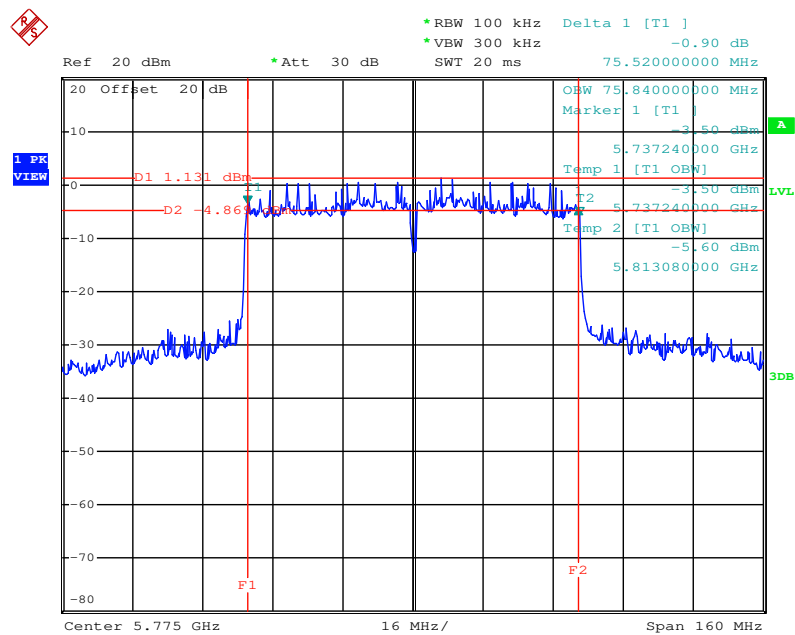
Date: 14.FEB.2014 07:10:36

Power Density Plot on Configuration IEEE 802.11ac 80MHz Nss1MCS0 / CH 155 / Ant. 2



Date: 14.FEB.2014 07:11:06

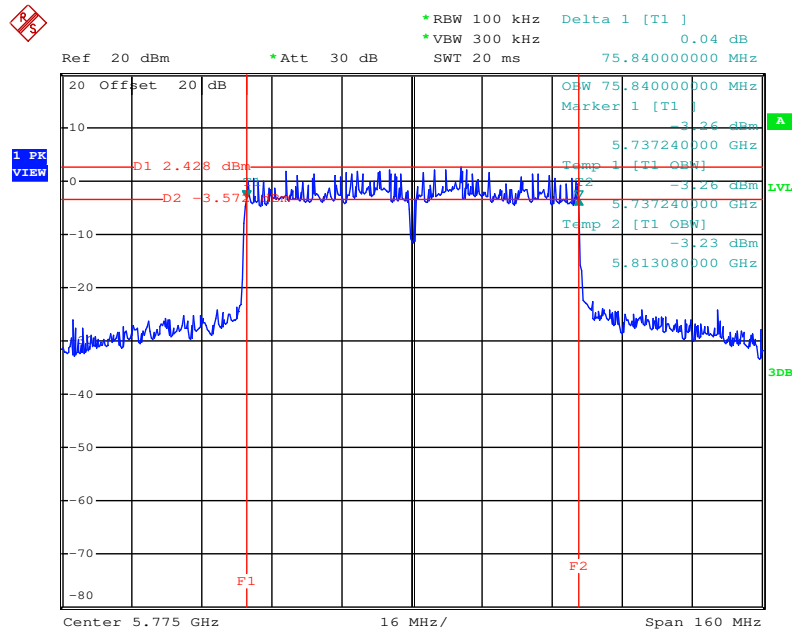
Power Density Plot on Configuration IEEE 802.11ac 80MHz Nss1MCS0 / CH 155 / Ant. 3



Date: 14.FEB.2014 07:12:48

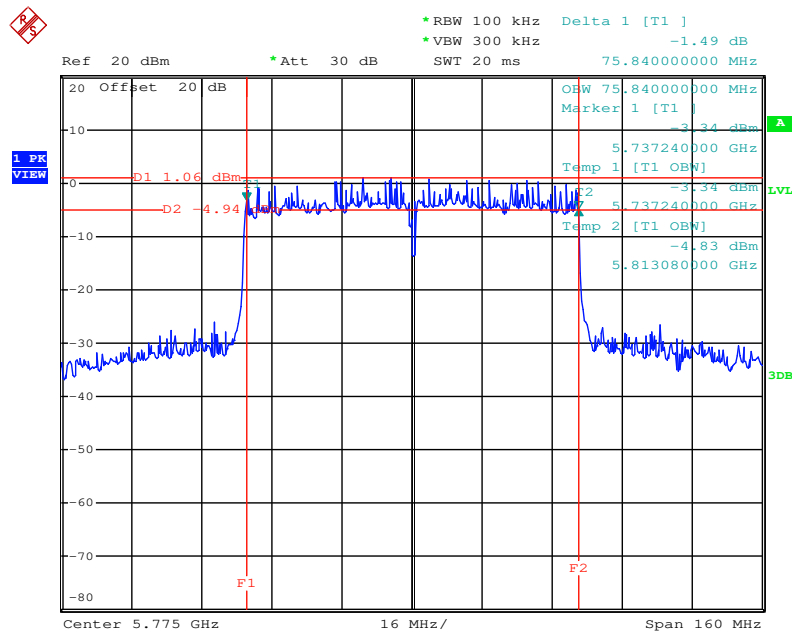
For <Nss2MCS0, Ant. 1+2+3>

Power Density Plot on Configuration IEEE 802.11ac 80MHz Nss2MCS0 / CH 155 / Ant. 1



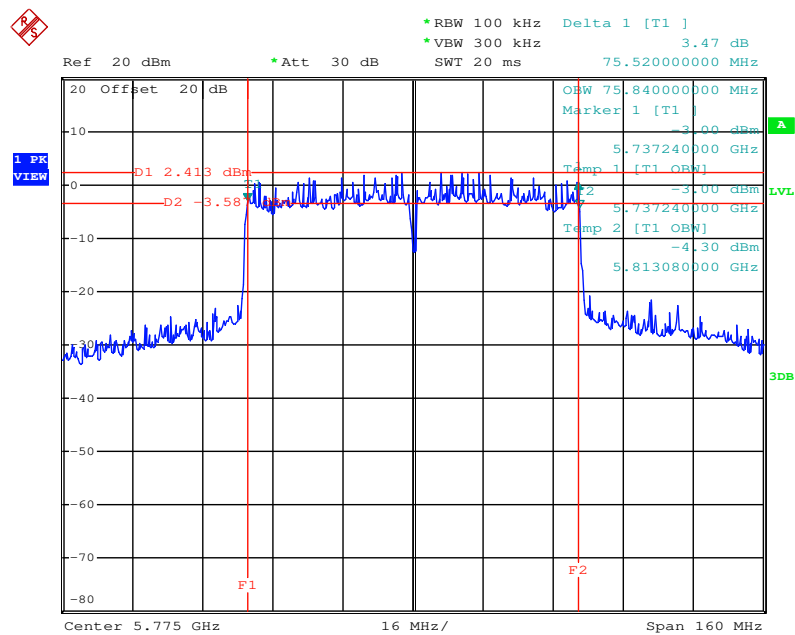
Date: 14.FEB.2014 07:16:19

Power Density Plot on Configuration IEEE 802.11ac 80MHz Nss2MCS0 / CH 155 / Ant. 2



Date: 14.FEB.2014 07:15:25

Power Density Plot on Configuration IEEE 802.11ac 80MHz Nss2MCS0 / CH 155 / Ant. 3



Date: 14.FEB.2014 07:14:38

For Beamforming

Test date	Feb. 13, 2014	Test Site No.	TH01-CB
Temperature	26°C	Humidity	63%
Test Engineer	Magic Lai	Configuration	802.11ac 20MHz

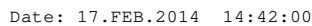
Configuration IEEE 802.11ac 20MHz**<Nss1MCS0, Ant. 1+2+3, CDD>**

Channel	Frequency	6dB Bandwidth (MHz)			99% Occupied Bandwidth (MHz)			Min. Limit (kHz)	Test Result
		Ant. 1	Ant. 2	Ant. 3	Ant. 1	Ant. 2	Ant. 3		
149	5745 MHz	17.36	17.52	17.60	18.24	17.92	20.40	500	Complies
157	5785 MHz	17.36	17.60	17.52	18.64	17.92	19.36	500	Complies
165	5825 MHz	17.60	17.60	17.60	24.56	18.00	24.08	500	Complies

<Nss2MCS0, Ant. 1+2+3, CDD>

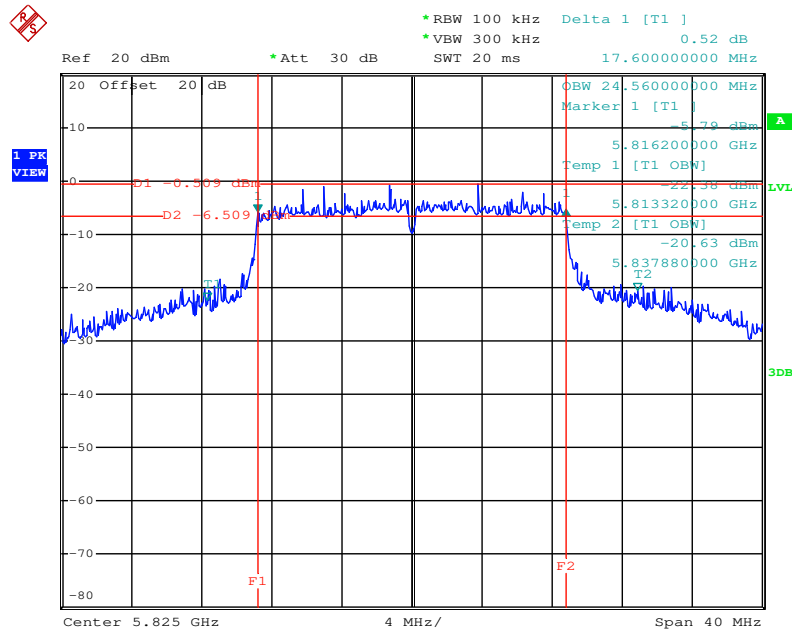
Channel	Frequency	6dB Bandwidth (MHz)			99% Occupied Bandwidth (MHz)			Min. Limit (kHz)	Test Result
		Ant. 1	Ant. 2	Ant. 3	Ant. 1	Ant. 2	Ant. 3		
149	5745 MHz	17.60	17.68	17.68	18.72	17.84	18.88	500	Complies
157	5785 MHz	17.60	17.76	17.68	19.28	17.76	18.40	500	Complies
165	5825 MHz	17.60	17.60	17.76	21.68	17.84	19.44	500	Complies

6 dB Bandwidth Plot on Configuration IEEE 802.11ac 20MHz Nss1MCS0 / CH 149 / Ant. 1



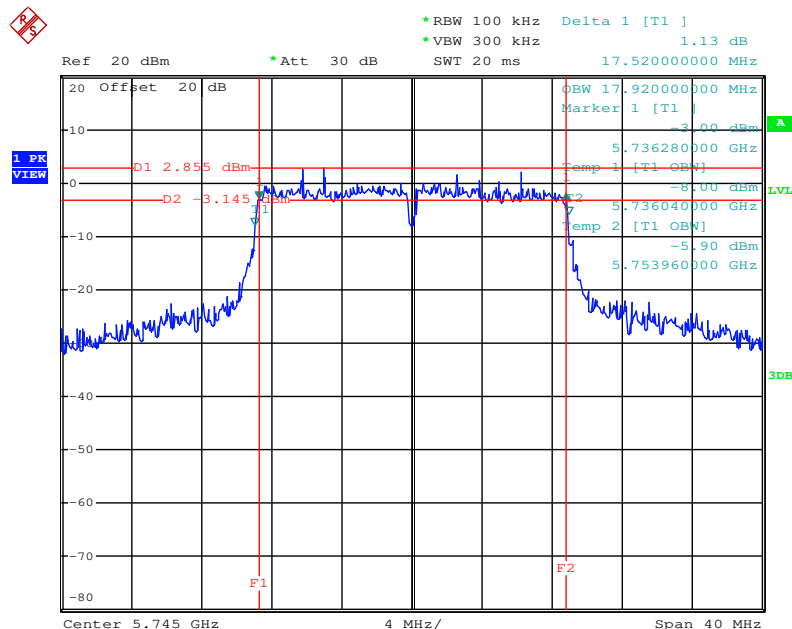
Date: 17.FEB.2014 14:44:23

6 dB Bandwidth Plot on Configuration IEEE 802.11ac 20MHz Nss1MCS0 / CH 165 / Ant. 1



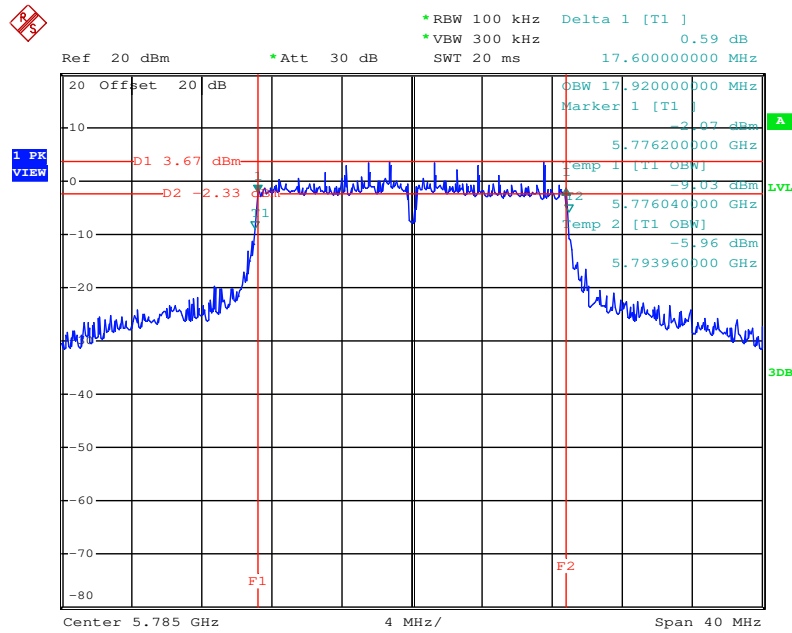
Date: 17.FEB.2014 15:25:12

6 dB Bandwidth Plot on Configuration IEEE 802.11ac 20MHz Nss1MCS0 / CH 149 / Ant. 2



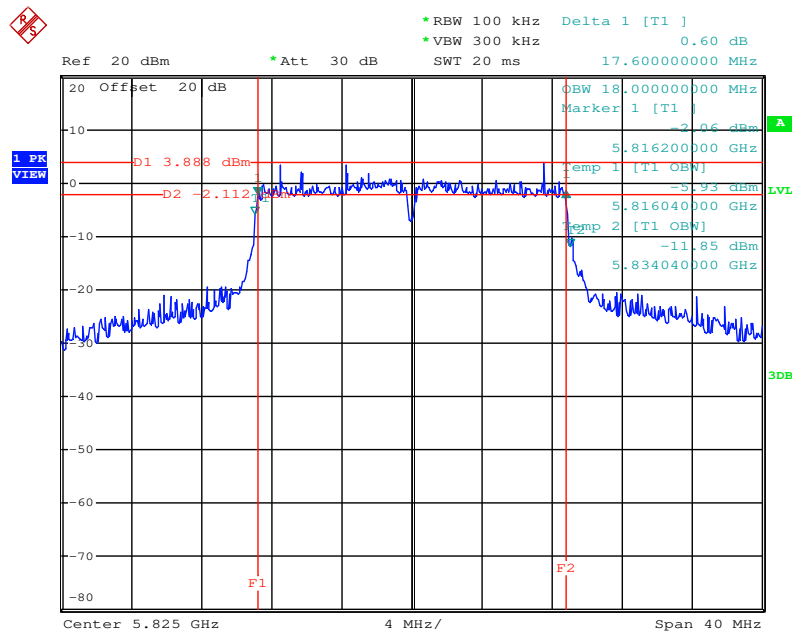
Date: 17.FEB.2014 14:42:43

6 dB Bandwidth Plot on Configuration IEEE 802.11ac 20MHz Nss1MCS0 / CH 157 / Ant. 2



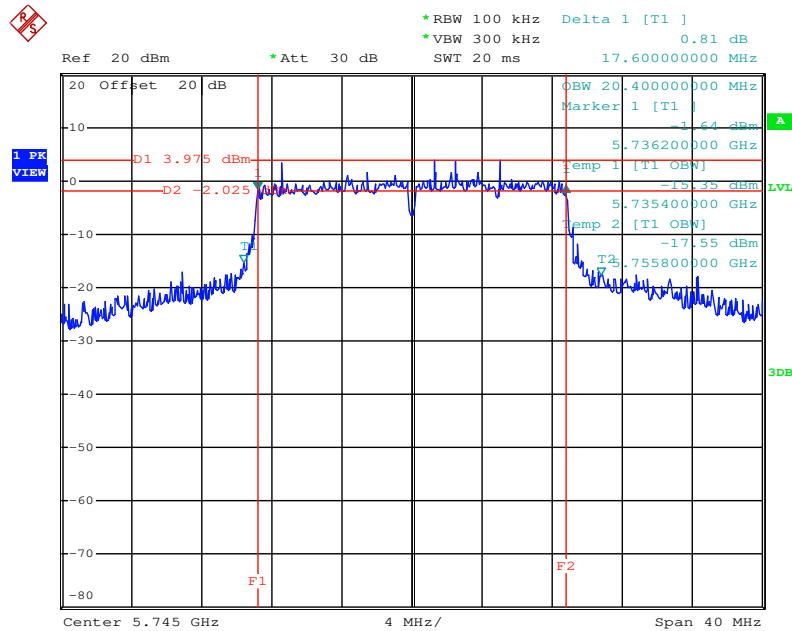
Date: 17.FEB.2014 14:45:12

6 dB Bandwidth Plot on Configuration IEEE 802.11ac 20MHz Nss1MCS0 / CH 165 / Ant. 2



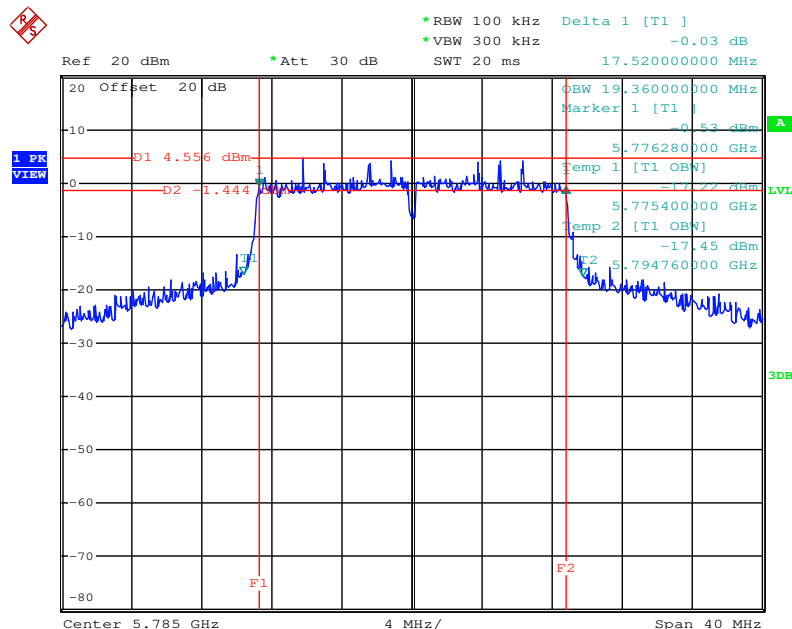
Date: 17.FEB.2014 15:24:25

6 dB Bandwidth Plot on Configuration IEEE 802.11ac 20MHz Nss1MCS0 / CH 149 / Ant. 3



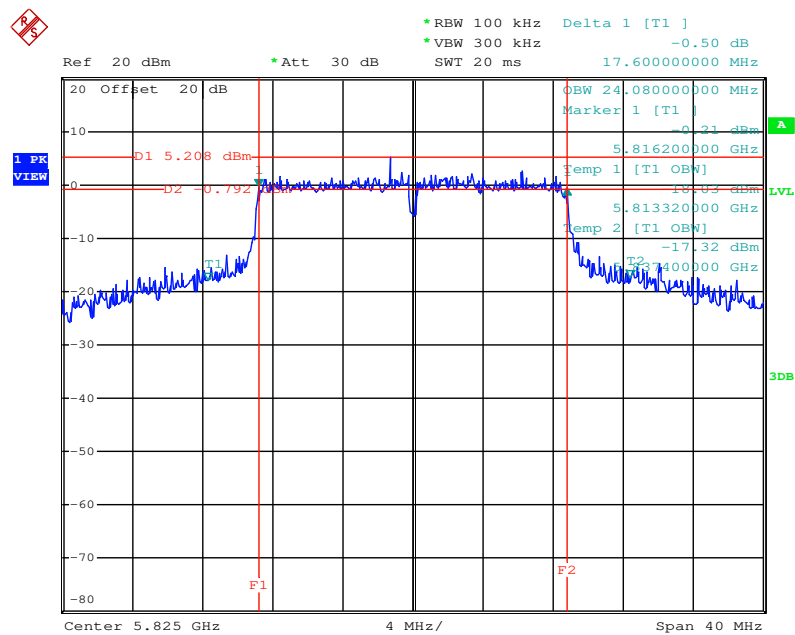
Date: 17.FEB.2014 14:43:19

6 dB Bandwidth Plot on Configuration IEEE 802.11ac 20MHz Nss1MCS0 / CH 157 / Ant. 3



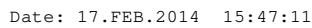
Date: 17.FEB.2014 14:49:34

6 dB Bandwidth Plot on Configuration IEEE 802.11ac 20MHz Nss1MCS0 / CH 165 / Ant. 3



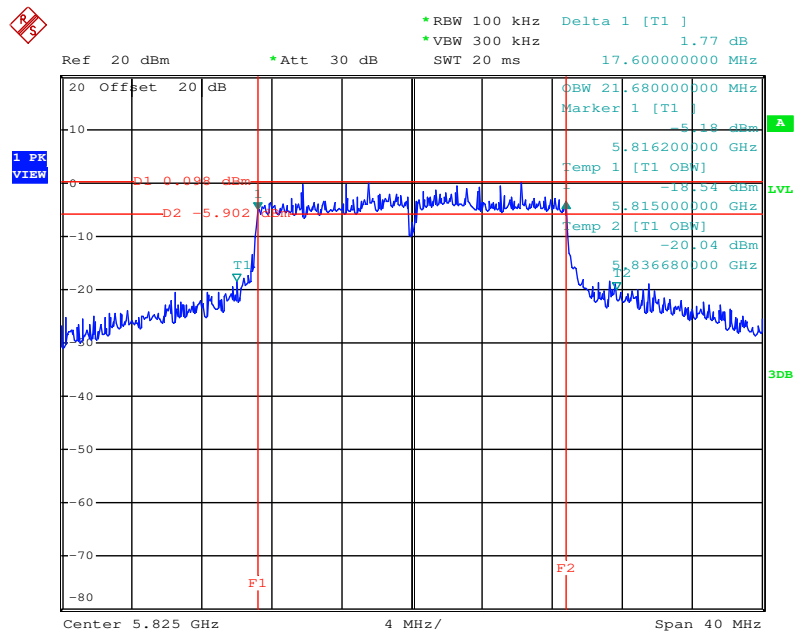
Date: 17.FEB.2014 15:23:39

6 dB Bandwidth Plot on Configuration IEEE 802.11ac 20MHz Nss2MCS0 / CH 149 / Ant. 1



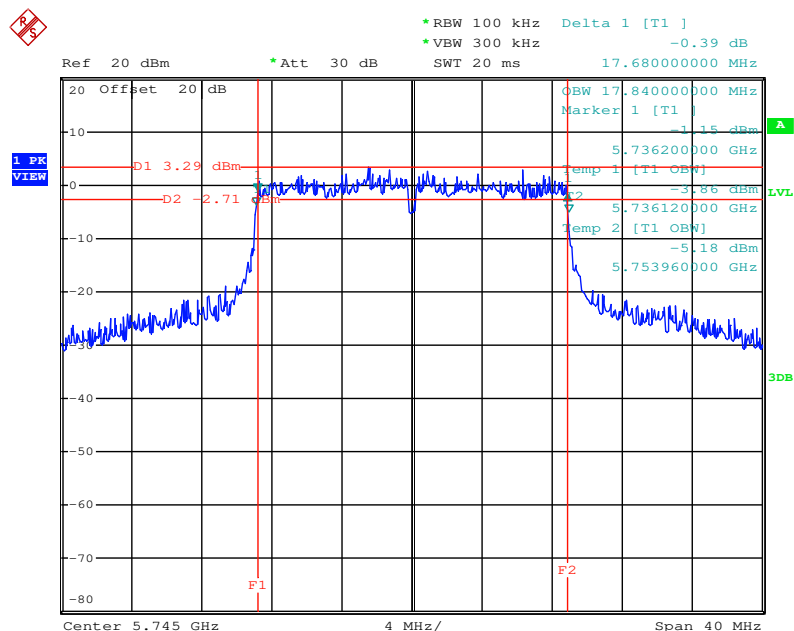
Date: 17.FEB.2014 15:46:21

6 dB Bandwidth Plot on Configuration IEEE 802.11ac 20MHz Nss2MCS0 / CH 165 / Ant. 1



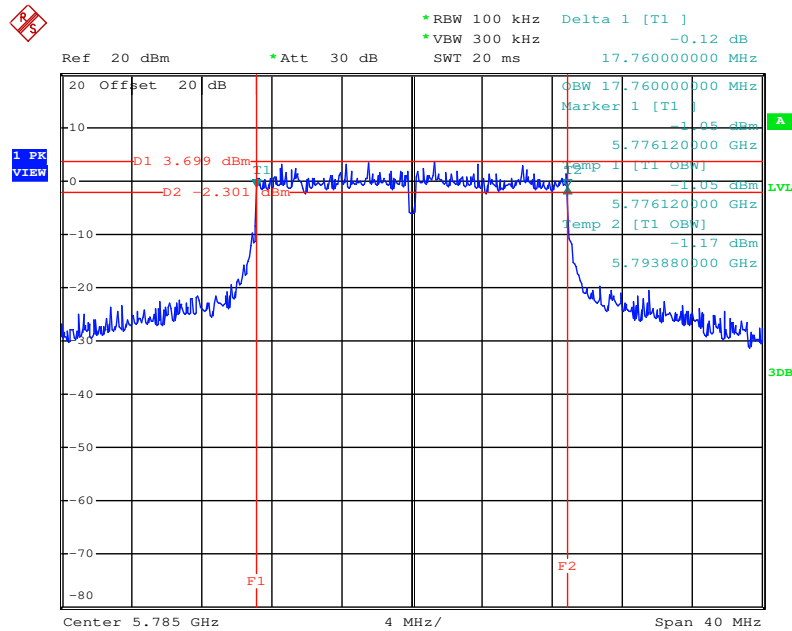
Date: 17.FEB.2014 15:43:51

6 dB Bandwidth Plot on Configuration IEEE 802.11ac 20MHz Nss2MCS0 / CH 149 / Ant. 2



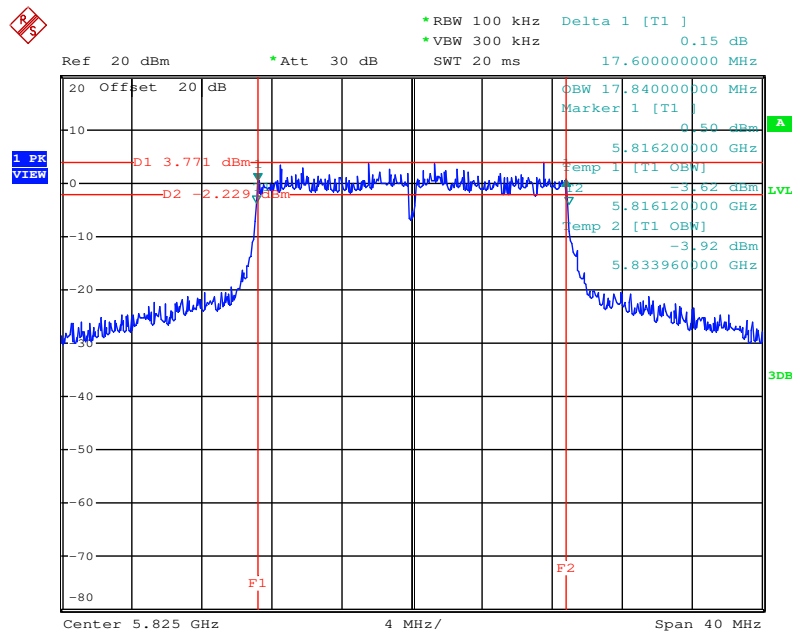
Date: 17.FEB.2014 15:47:31

6 dB Bandwidth Plot on Configuration IEEE 802.11ac 20MHz Nss2MCS0 / CH 157 / Ant. 2



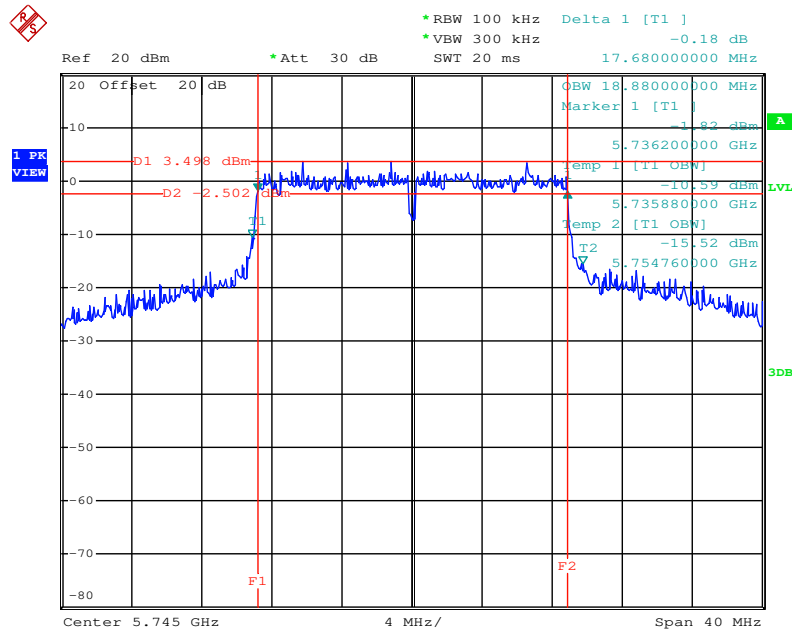
Date: 17.FEB.2014 15:46:00

6 dB Bandwidth Plot on Configuration IEEE 802.11ac 20MHz Nss2MCS0 / CH 165 / Ant. 2



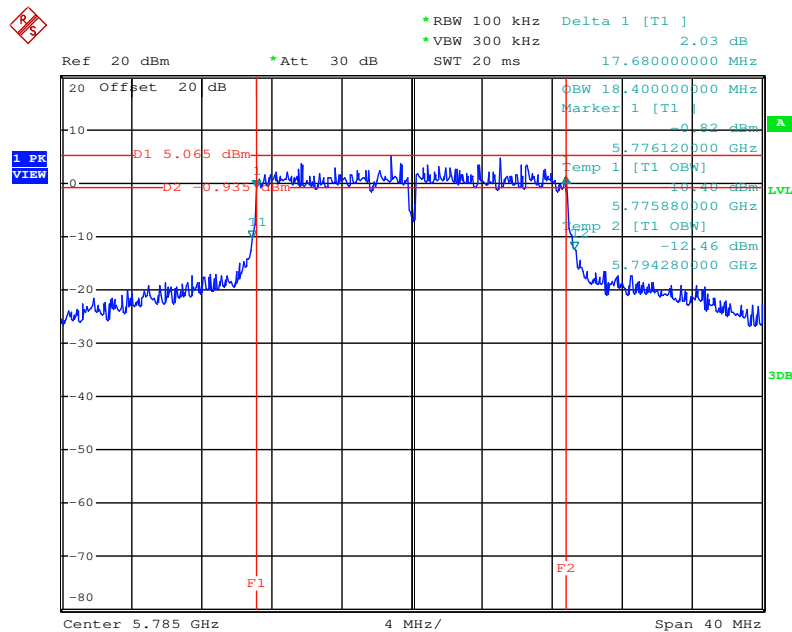
Date: 17.FEB.2014 15:44:19

6 dB Bandwidth Plot on Configuration IEEE 802.11ac 20MHz Nss2MCS0 / CH 149 / Ant. 3



Date: 17.FEB.2014 15:47:48

6 dB Bandwidth Plot on Configuration IEEE 802.11ac 20MHz Nss2MCS0 / CH 157 / Ant. 3



Date: 17.FEB.2014 15:45:32

Ref 20 dBm *Att 30 dB Delta 1 [T1] 0.89 dB
 17.760000000 MHz

20 Offset 20 dB

10

0

-10

-20

-30

-40

-50

-60

-70

-80

D1 3.696 dBm

D2 -2.304 dBm

F1

F2

Marker 1 [T1] 19.440000000 MHz -2.27 dBm

Temp 1 [T1 OBW] 5.816120000 GHz -16.63 dBm

Temp 2 [T1 OBW] 5.815480000 GHz -17.53 dBm

T2 5.834920000 GHz

Center 5.825 GHz 4 MHz/ Span 40 MHz

Date: 17.FEB.2014 15:44:41

Test date	Feb. 13, 2014	Test Site No.	TH01-CB
Temperature	26°C	Humidity	63%
Test Engineer	Magic Lai	Configuration	802.11ac 40MHz

Configuration IEEE 802.11ac 40MHz

<Nss1MCS0, Ant. 1+2+3, CDD>

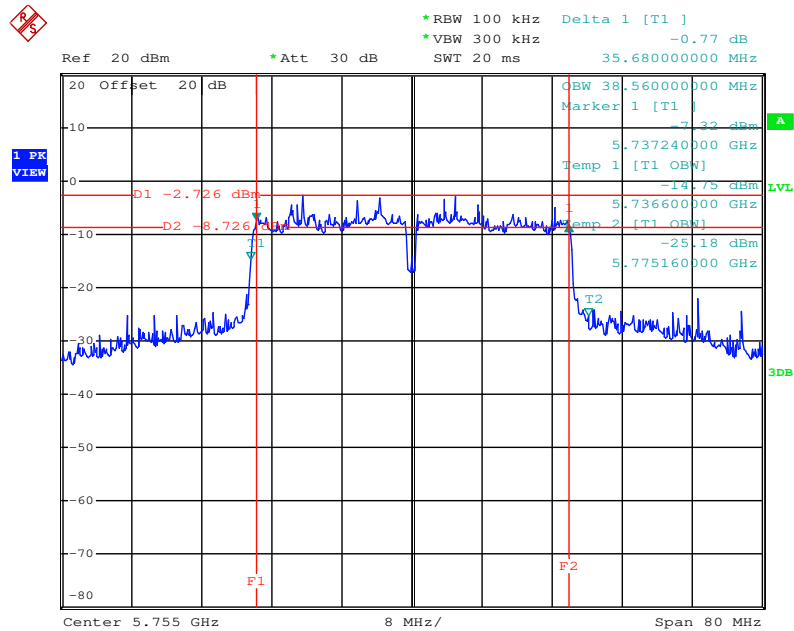
Channel	Frequency	6dB Bandwidth (MHz)			99% Occupied Bandwidth (MHz)			Min. Limit (kHz)	Test Result
		Ant. 1	Ant. 2	Ant. 3	Ant. 1	Ant. 2	Ant. 3		
151	5755 MHz	35.68	36.32	36.32	38.56	36.48	38.24	500	Complies
159	5795 MHz	36.68	36.48	36.16	45.60	36.48	37.12	500	Complies

<Nss2MCS0, Ant. 1+2+3, CDD>

Channel	Frequency	6dB Bandwidth (MHz)			99% Occupied Bandwidth (MHz)			Min. Limit (kHz)	Test Result
		Ant. 1	Ant. 2	Ant. 3	Ant. 1	Ant. 2	Ant. 3		
151	5755 MHz	36.48	36.48	36.48	40.32	36.32	36.64	500	Complies
159	5795 MHz	36.48	36.32	36.48	41.60	36.32	36.64	500	Complies

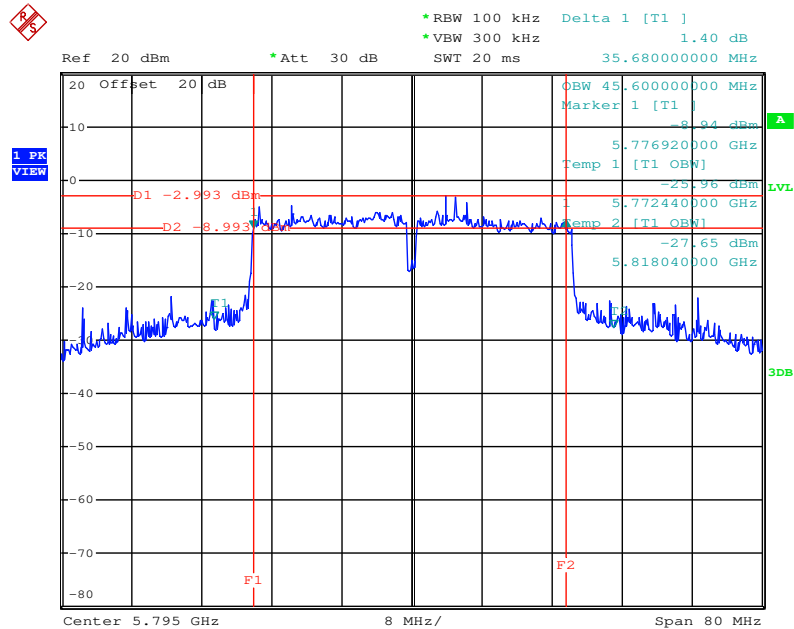
For <Nss1MCS0, Ant. 1+2+3, CDD>

6 dB Bandwidth Plot on Configuration IEEE 802.11ac 40MHz Nss1MCS0 / CH 151 / Ant. 1



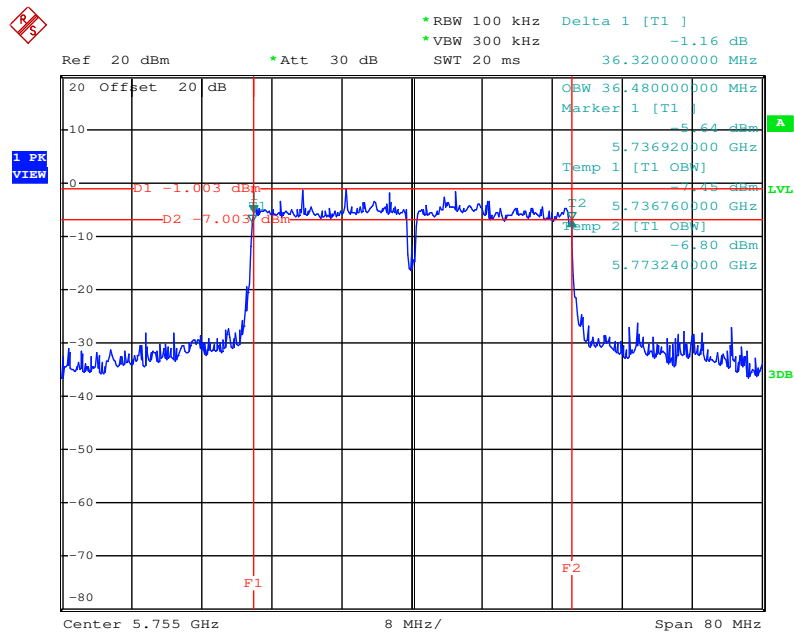
Date: 17.FEB.2014 15:35:31

6 dB Bandwidth Plot on Configuration IEEE 802.11ac 40MHz Nss1MCS0 / CH 159 / Ant. 1



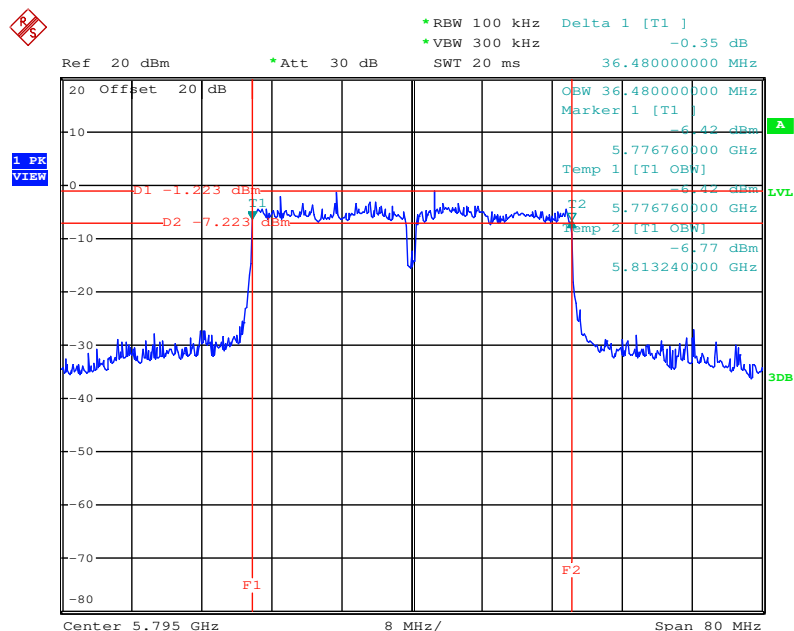
Date: 17.FEB.2014 15:33:12

6 dB Bandwidth Plot on Configuration IEEE 802.11ac 40MHz Nss1MCS0 / CH 151 / Ant. 2



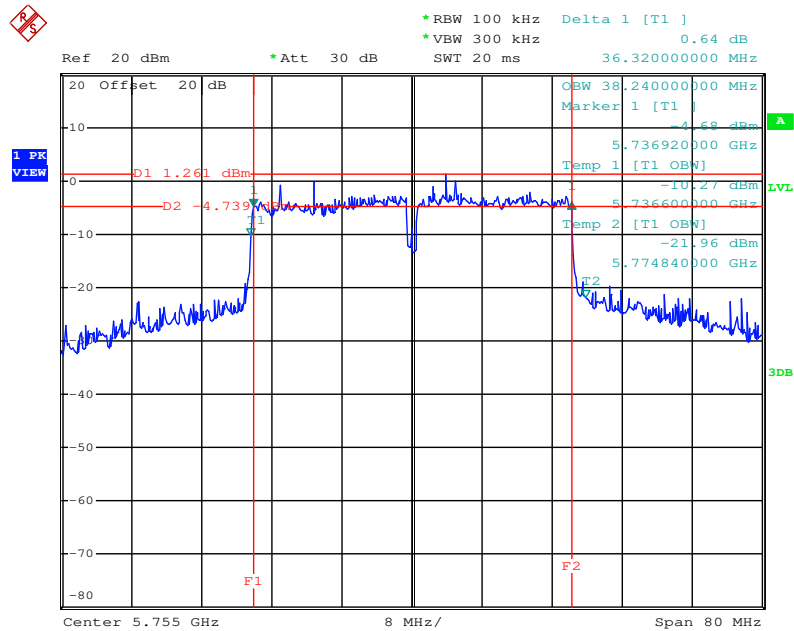
Date: 17.FEB.2014 15:35:06

6 dB Bandwidth Plot on Configuration IEEE 802.11ac 40MHz Nss1MCS0 / CH 159 / Ant. 2



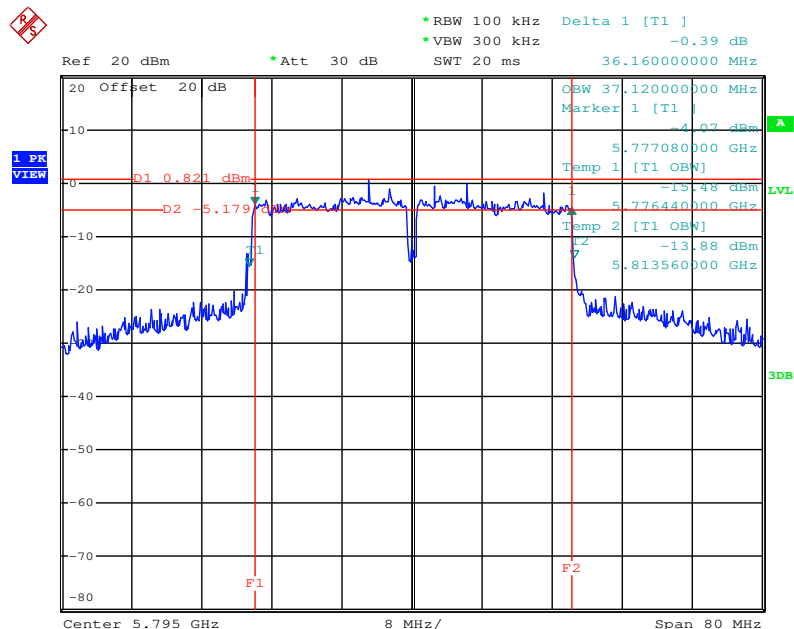
Date: 17.FEB.2014 15:33:37

6 dB Bandwidth Plot on Configuration IEEE 802.11ac 40MHz Nss1MCS0 / CH 151 / Ant. 3



Date: 17.FEB.2014 15:34:43

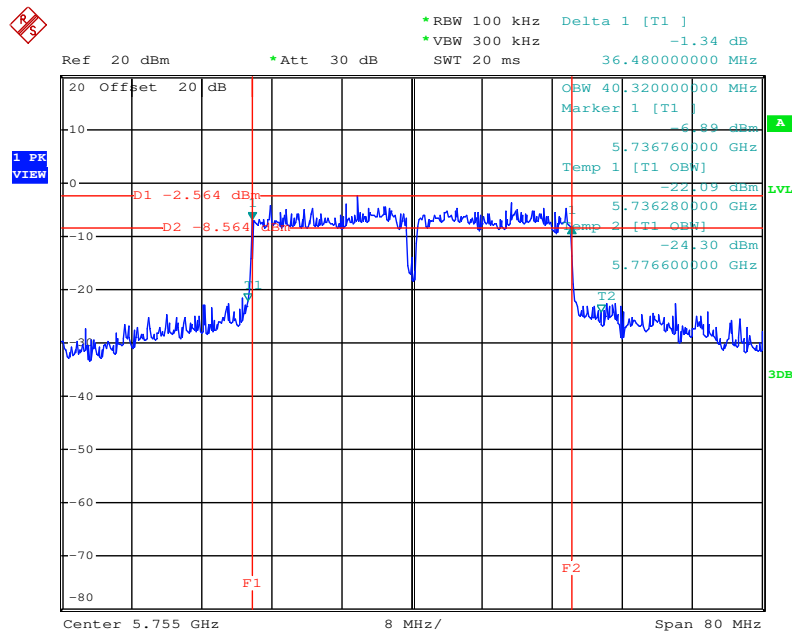
6 dB Bandwidth Plot on Configuration IEEE 802.11ac 40MHz Nss1MCS0 / CH 159 / Ant. 3



Date: 17.FEB.2014 15:33:52

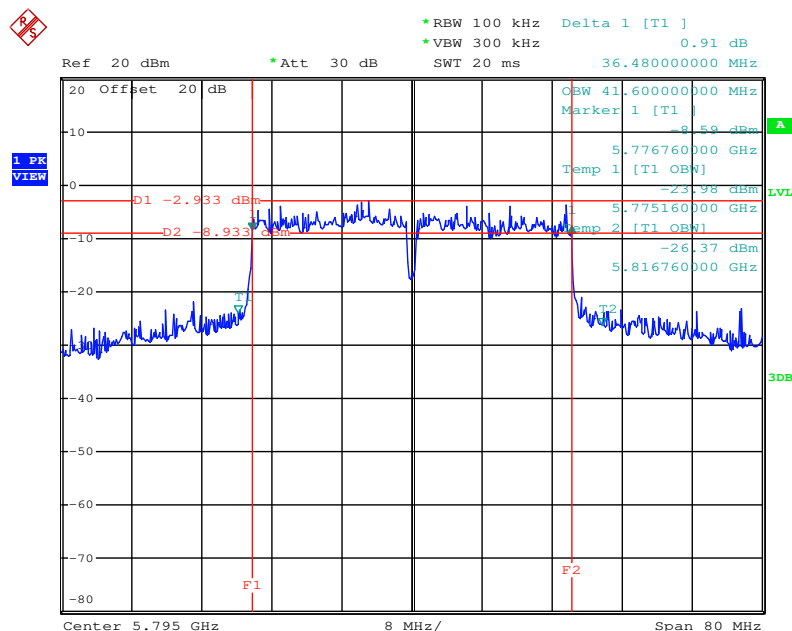
For <Nss2MCS0, Ant. 1+2+3, CDD>

6 dB Bandwidth Plot on Configuration IEEE 802.11ac 40MHz Nss2MCS0 / CH 151 / Ant. 1



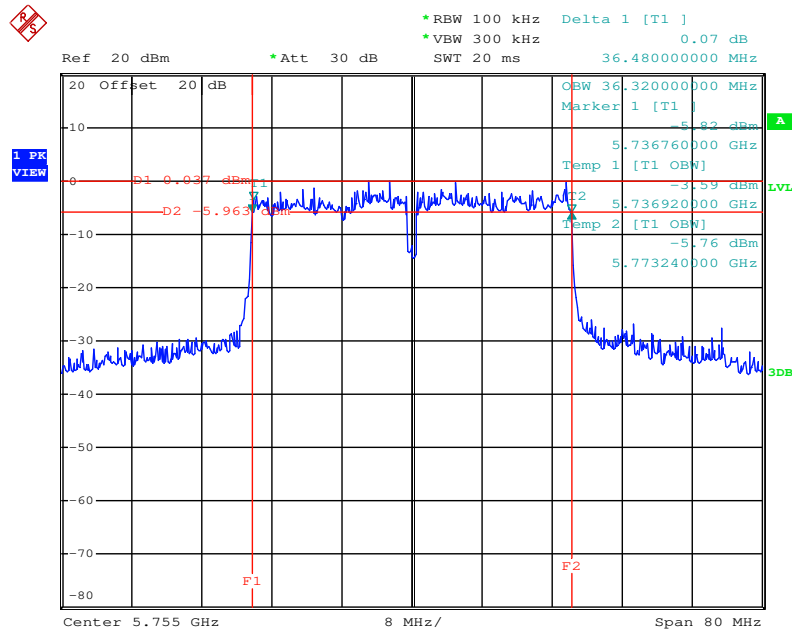
Date: 17.FEB.2014 15:27:30

6 dB Bandwidth Plot on Configuration IEEE 802.11ac 40MHz Nss2MCS0 / CH 159 / Ant. 1



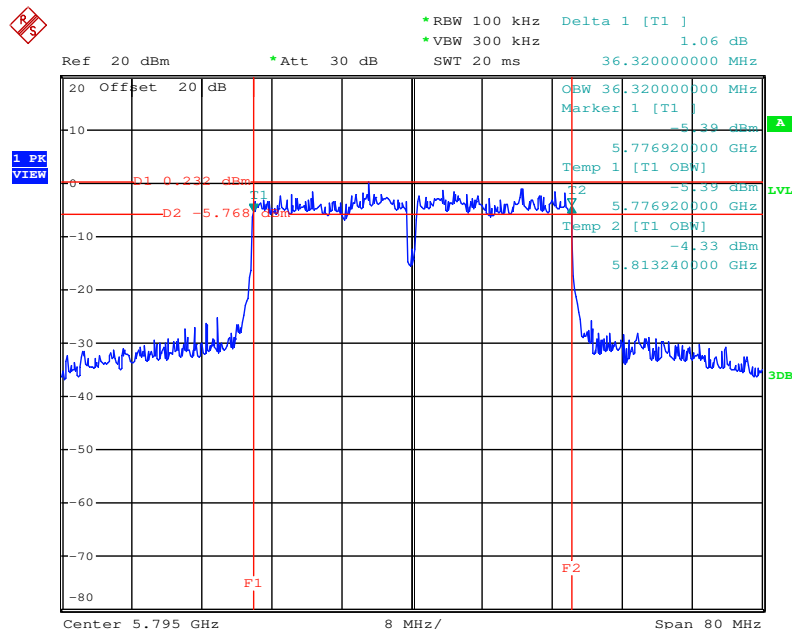
Date: 17.FEB.2014 15:30:39

6 dB Bandwidth Plot on Configuration IEEE 802.11ac 40MHz Nss2MCS0 / CH 151 / Ant. 2



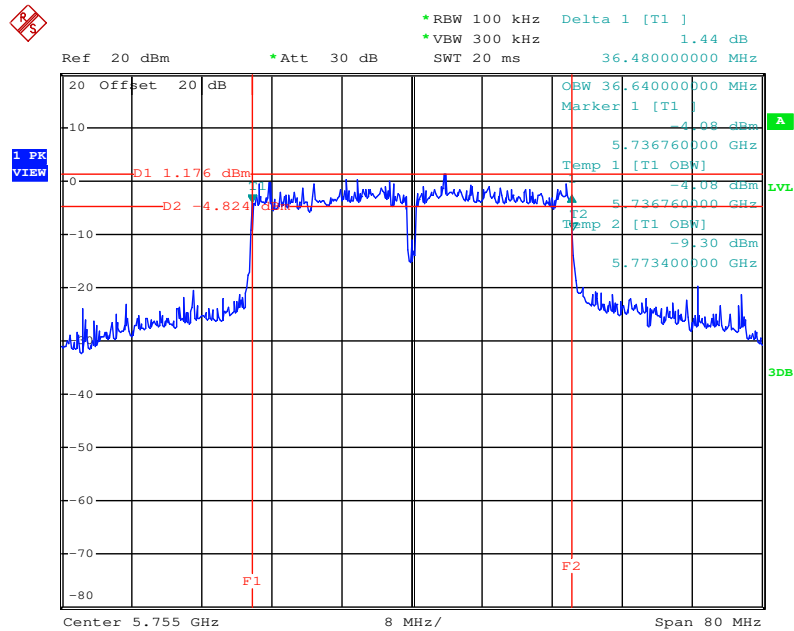
Date: 17.FEB.2014 15:28:02

6 dB Bandwidth Plot on Configuration IEEE 802.11ac 40MHz Nss2MCS0 / CH 159 / Ant. 2



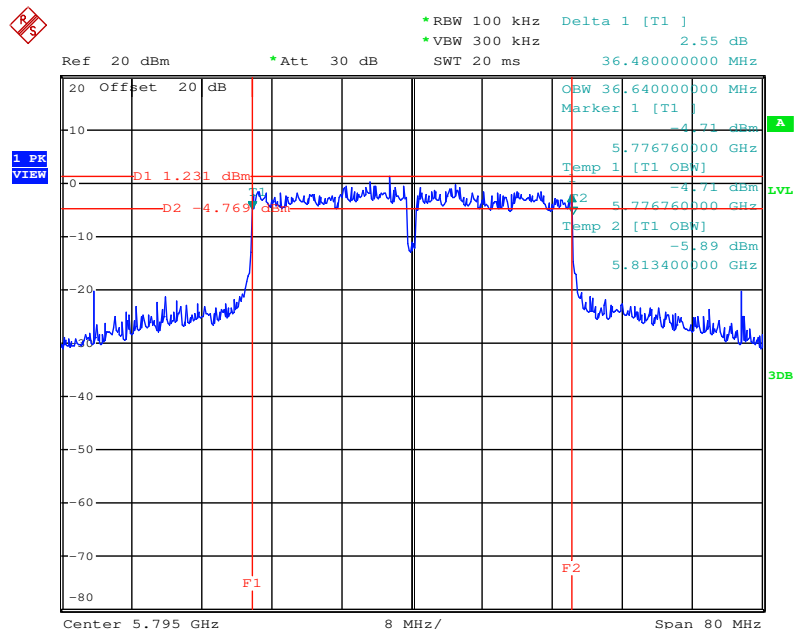
Date: 17.FEB.2014 15:30:16

6 dB Bandwidth Plot on Configuration IEEE 802.11ac 40MHz Nss2MCS0 / CH 151 / Ant. 3



Date: 17.FEB.2014 15:28:24

6 dB Bandwidth Plot on Configuration IEEE 802.11ac 40MHz Nss2MCS0 / CH 159 / Ant. 3



Date: 17.FEB.2014 15:29:48

Test date	Feb. 13, 2014	Test Site No.	TH01-CB
Temperature	26°C	Humidity	63%
Test Engineer	Magic Lai	Configuration	802.11ac 80MHz

Configuration IEEE 802.11ac 80MHz

<Nss1MCS0, Ant. 1+2+3, CDD>

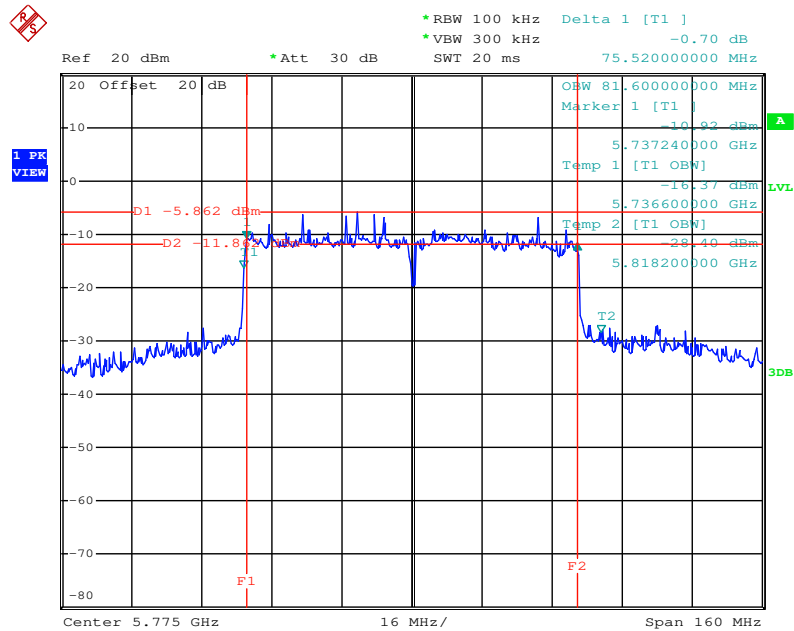
Channel	Frequency	6dB Bandwidth (MHz)			99% Occupied Bandwidth (MHz)			Min. Limit (kHz)	Test Result
		Ant. 1	Ant. 2	Ant. 3	Ant. 1	Ant. 2	Ant. 3		
155	5775 MHz	75.52	73.60	73.92	81.60	76.48	76.80	500	Complies

<Nss2MCS0, Ant. 1+2+3, CDD>

Channel	Frequency	6dB Bandwidth (MHz)			99% Occupied Bandwidth (MHz)			Min. Limit (kHz)	Test Result
		Ant. 1	Ant. 2	Ant. 3	Ant. 1	Ant. 2	Ant. 3		
155	5775 MHz	76.16	76.48	75.84	77.44	76.16	76.48	500	Complies

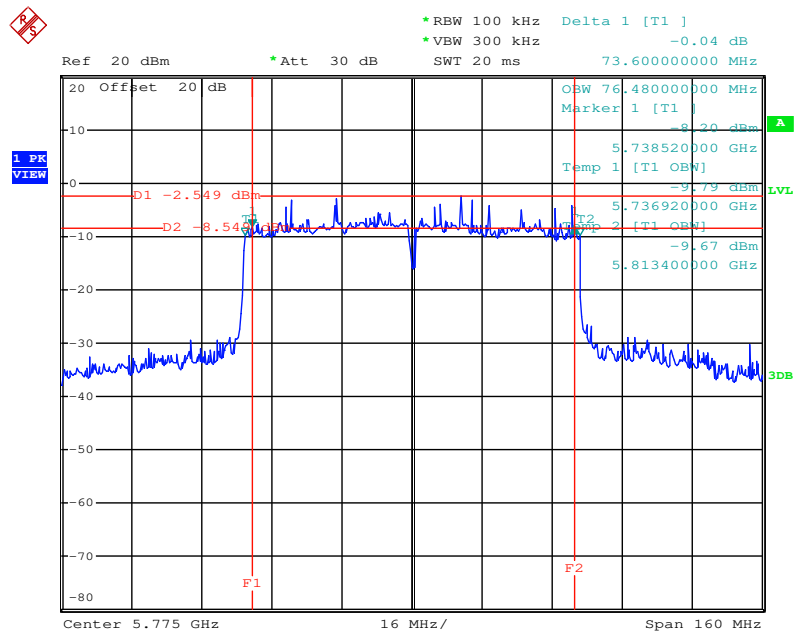
For <Nss1MCS0, Ant. 1+2+3, CDD>

Power Density Plot on Configuration IEEE 802.11ac 80MHz Nss1MCS0 / CH 155 / Ant. 1



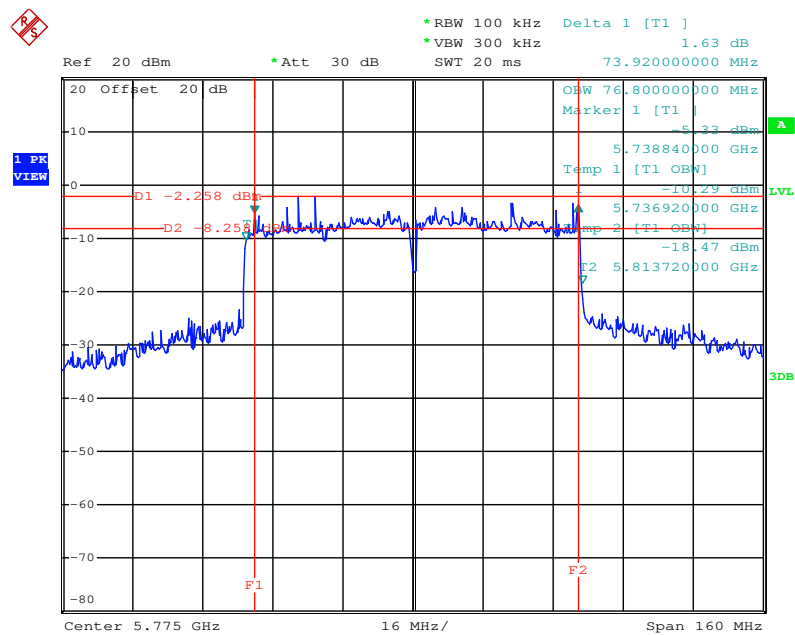
Date: 17.FEB.2014 15:38:58

Power Density Plot on Configuration IEEE 802.11ac 80MHz Nss1MCS0 / CH 155 / Ant. 2



Date: 17.FEB.2014 15:39:27

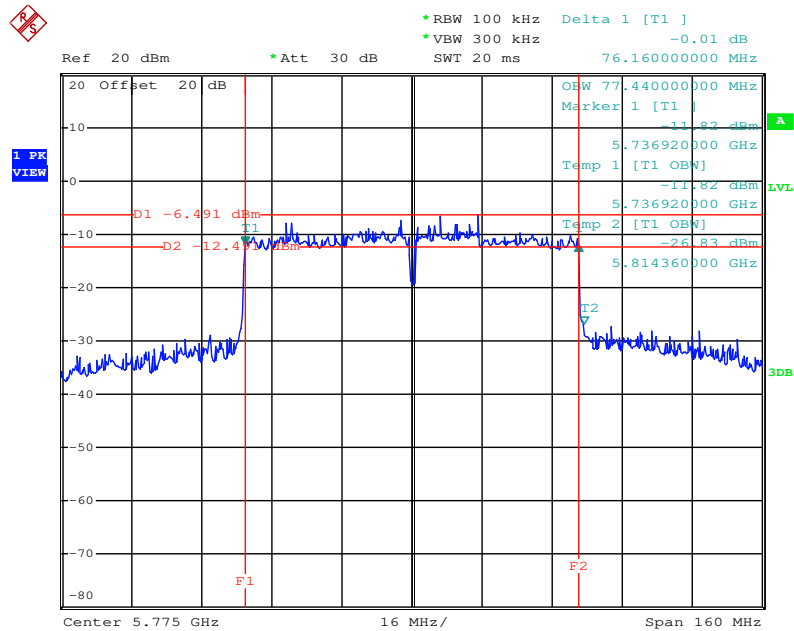
Power Density Plot on Configuration IEEE 802.11ac 80MHz Nss1MCS0 / CH 155 / Ant. 3



Date: 17.FEB.2014 15:39:56

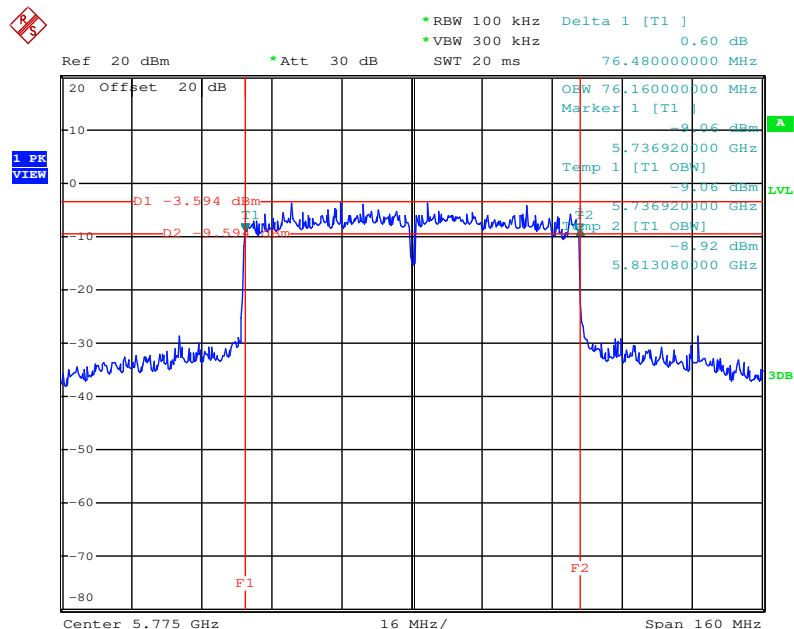
For <Nss2MCS0, Ant. 1+2+3, CDD>

Power Density Plot on Configuration IEEE 802.11ac 80MHz Nss2MCS0 / CH 155 / Ant. 1



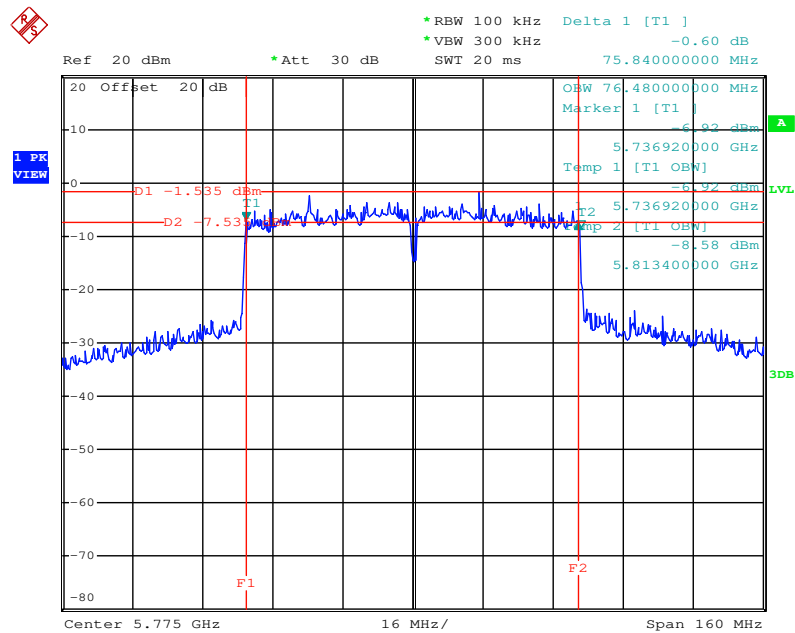
Date: 17.FEB.2014 15:42:07

Power Density Plot on Configuration IEEE 802.11ac 80MHz Nss2MCS0 / CH 155 / Ant. 2



Date: 17.FEB.2014 15:41:47

Power Density Plot on Configuration IEEE 802.11ac 80MHz Nss2MCS0 / CH 155 / Ant. 3



Date: 17.FEB.2014 15:41:13

4.5. Radiated Emissions Measurement**4.5.1. Limit**

30dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (microvolt/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

4.5.2. Measuring Instruments and Setting

Please refer to section 6 of equipments list in this report. The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1GHz
Stop Frequency	10th carrier harmonic
RBW / VBW (Emission in restricted band)	1MHz / 3MHz for Peak, 1MHz / 10Hz for Average
RBW / VBW (Emission in non-restricted band)	100kHz / 300kHz for peak

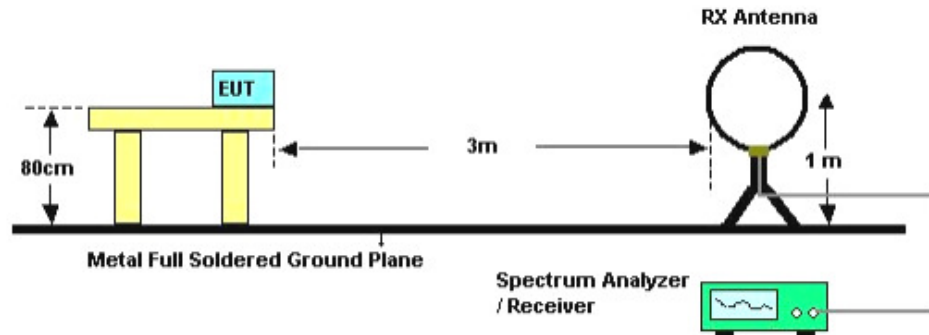
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1GHz / RBW 120kHz for QP

4.5.3. Test Procedures

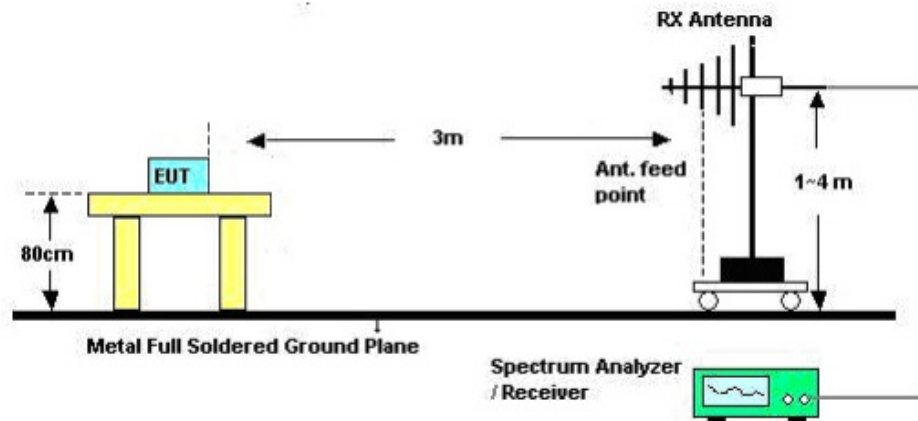
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 m to 4 m) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and 3MHz RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High – Low scan is not required in this case.

4.5.4. Test Setup Layout

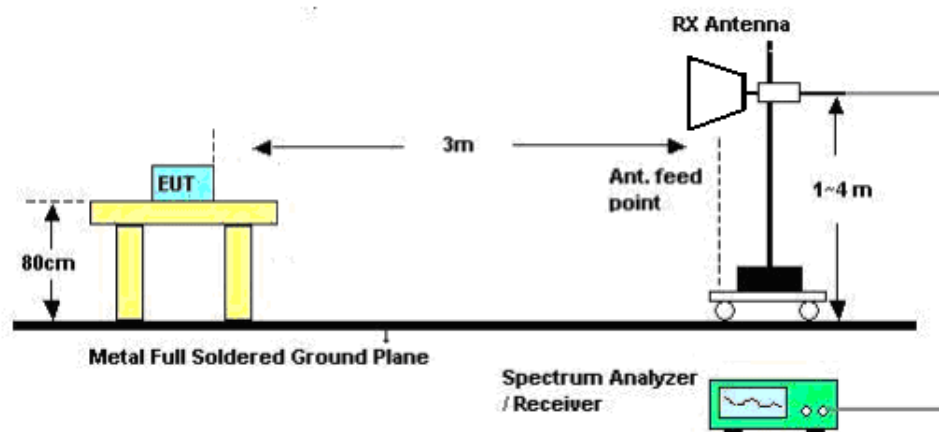
For Radiated Emissions below 1GHz (9kHz~30MHz)



For Radiated Emissions below 1GHz (30MHz~1GHz)



For Radiated Emissions above 1GHz



4.5.5. Test Deviation

There are no deviations with the original standard.

4.5.6. EUT Operation during Test

For Non-beamforming mode:

The EUT was programmed to be in continuously transmitting mode.

For beamforming mode:

The EUT was programmed to be in beamforming transmitting mode.

4.5.7. Results of Radiated Emissions (9kHz~30MHz)

Frequency Range	9kHz~30MHz	Test Site No.	03CH01-CB
Temperature	24°C	Humidity	55%
Test Engineer	David Tseng	Configurations	CTX
Test Date	Feb. 26, 2014		

Freq. (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Remark
-	-	-	-	See Note

Note:

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

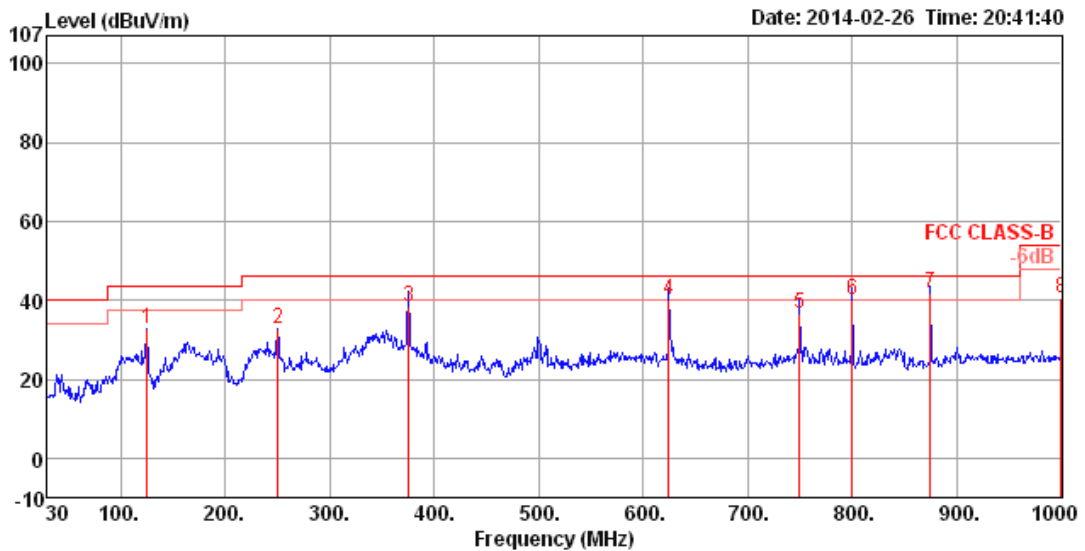
Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor.

4.5.8. Results of Radiated Emissions (30MHz~1GHz)

Frequency Range	30MHz~1GHz	Test Site No.	03CH01-CB
Temperature	24°C	Humidity	55%
Test Engineer	David Tseng	Configurations	CTX

Horizontal



	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	125.06	32.73	43.50	-10.77	51.24	1.33	11.73	31.57	150	211	HORIZONTAL	Peak
2	250.19	32.73	46.00	-13.27	50.41	1.90	11.91	31.49	125	119	HORIZONTAL	Peak
3	375.32	38.52	46.00	-7.48	52.58	2.44	14.93	31.43	100	301	HORIZONTAL	QP
4	624.61	40.23	46.00	-5.77	49.84	3.18	18.61	31.40	131	289	HORIZONTAL	QP
5	749.74	36.53	46.00	-9.47	44.68	3.53	19.69	31.37	100	329	HORIZONTAL	QP
6	800.18	40.17	46.00	-5.83	48.01	3.67	19.76	31.27	103	107	HORIZONTAL	QP
7	874.87	41.91	46.00	-4.09	48.93	3.89	20.24	31.15	100	296	HORIZONTAL	QP
8	1000.00	40.65	54.00	-13.35	46.18	4.21	21.44	31.18	125	327	HORIZONTAL	Peak

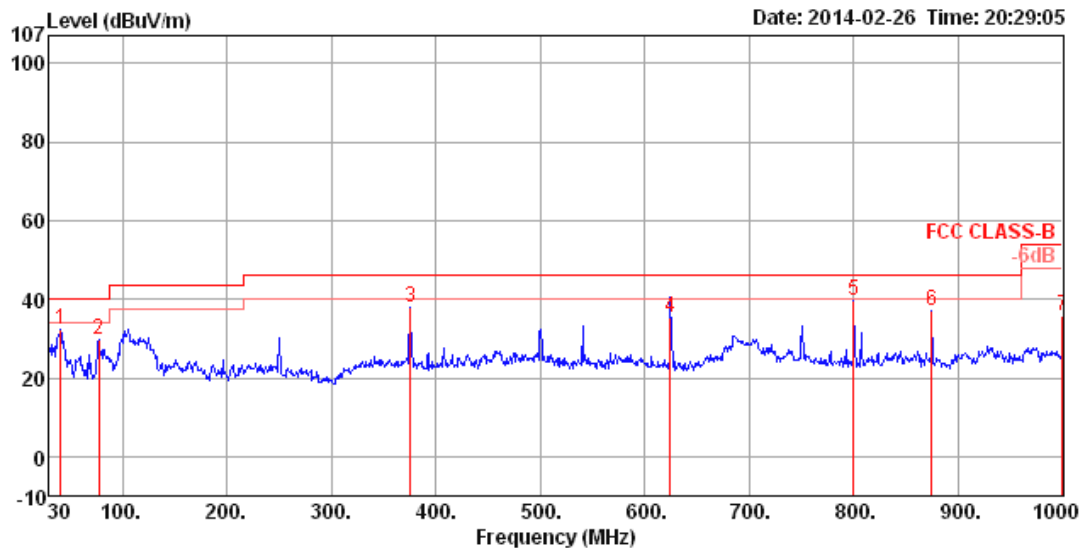
Note:

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

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Vertical



	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	40.67	32.41	40.00	-7.59	51.68	0.75	11.85	31.87	100	191	VERTICAL	Peak
2	77.53	29.58	40.00	-10.42	53.72	1.03	6.53	31.70	150	312	VERTICAL	Peak
3	375.32	38.14	46.00	-7.86	52.20	2.44	14.93	31.43	150	102	VERTICAL	Peak
4	624.61	35.41	46.00	-10.59	45.02	3.18	18.61	31.40	100	56	VERTICAL	QP
5	800.18	39.72	46.00	-6.28	47.56	3.67	19.76	31.27	100	91	VERTICAL	Peak
6	874.87	37.08	46.00	-8.92	44.10	3.89	20.24	31.15	125	303	VERTICAL	Peak
7	1000.00	35.96	54.00	-18.04	41.49	4.21	21.44	31.18	100	291	VERTICAL	Peak

Note:

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

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

4.5.9. Results for Radiated Emissions (1GHz~10th Harmonic)

Following channel(s) was (were) selected for the final test as listed below.

For Non-Beamforming

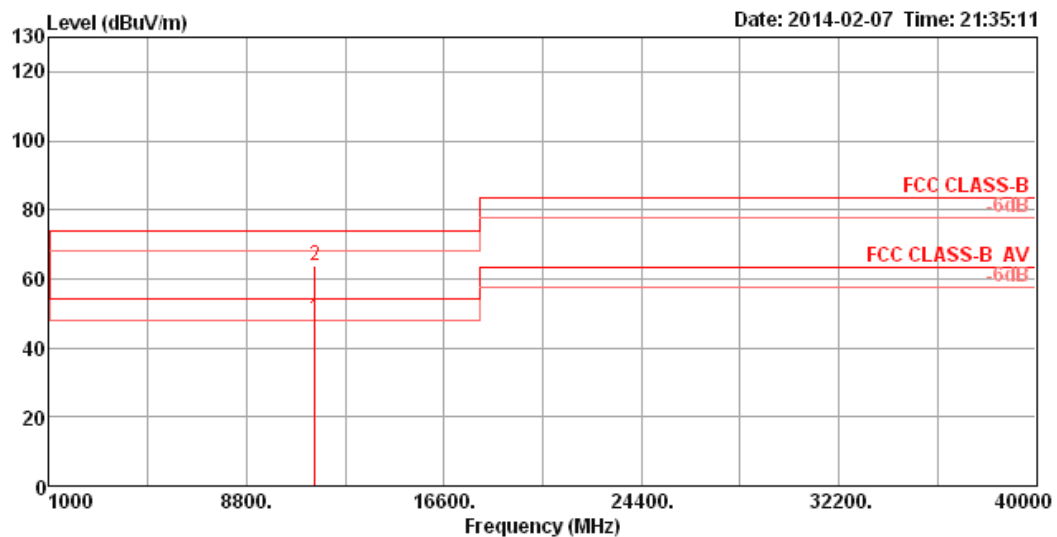
MODE	TX Chain	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	Ant.1	149, 157, 165	OFDM	BPSK	6
802.11a	Ant.1+2+3, CDD	149, 157, 165	OFDM	BPSK	6
802.11ac 20MHz	Ant.1	149, 157, 165	OFDM	BPSK	MCS0 (6.5)
802.11ac 20MHz	Ant.1+2+3, CDD	149, 157, 165	OFDM	BPSK	MCS0 (6.5)
802.11ac 20MHz	Ant.1+2+3, CDD	149, 157, 165	OFDM	BPSK	MCS0 (13)
802.11ac 40MHz	Ant.1	151, 159	OFDM	BPSK	MCS0 (13.5)
802.11ac 40MHz	Ant.1+2+3, CDD	151, 159	OFDM	BPSK	MCS0 (13.5)
802.11ac 40MHz	Ant.1+2+3, CDD	151, 159	OFDM	BPSK	MCS0 (27)
802.11ac 80MHz	Ant.3	155	OFDM	BPSK	MCS0 (29.3)
802.11ac 80MHz	Ant.1+2+3, CDD	155	OFDM	BPSK	MCS0 (29.3)
802.11ac 80MHz	Ant.1+2+3, CDD	155	OFDM	BPSK	MCS0 (58.5)

For Beamforming

MODE	TX Chain	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11ac 20MHz	Ant.1+2+3, CDD	149, 157, 165	OFDM	BPSK	MCS0 (6.5)
802.11ac 20MHz	Ant.1+2+3, CDD	149, 157, 165	OFDM	BPSK	MCS0 (13)
802.11ac 40MHz	Ant.1+2+3, CDD	151, 159	OFDM	BPSK	MCS0 (13.5)
802.11ac 40MHz	Ant.1+2+3, CDD	151, 159	OFDM	BPSK	MCS0 (27)
802.11ac 80MHz	Ant.1+2+3, CDD	155	OFDM	BPSK	MCS0 (29.3)
802.11ac 80MHz	Ant.1+2+3, CDD	155	OFDM	BPSK	MCS0 (58.5)

For Non-Beamforming

Transmitter Radiated Emissions (1GHz~10th Harmonic)					
Operating Mode	IEEE 802.11a CH 149 / Ant. 1			Polarization	H
Temperature	24°C	Humidity	55%	Test Engineer	David Tseng



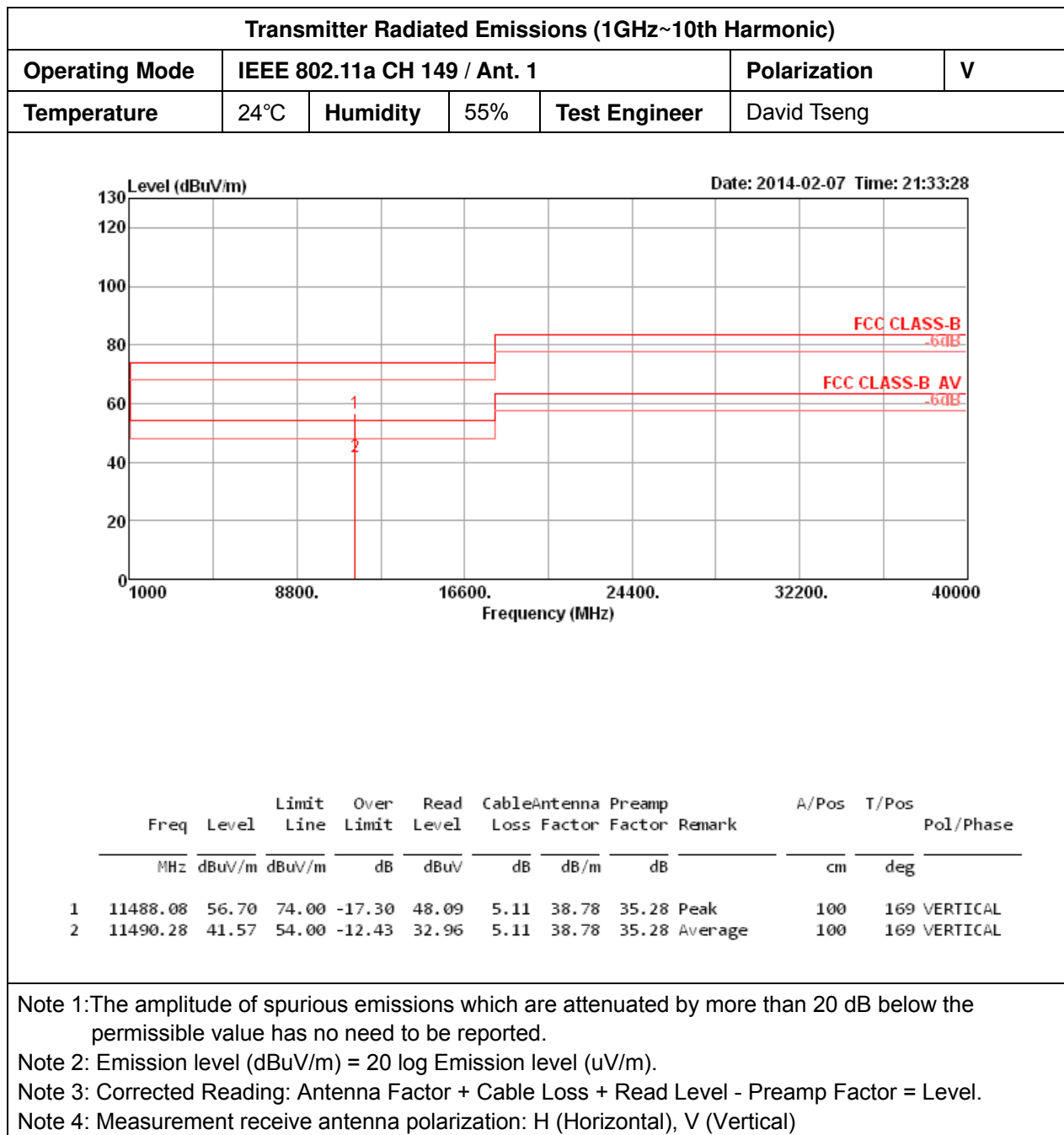
	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11491.80	48.45	54.00	-5.55	39.84	5.11	38.78	35.28	Average	104	181	HORIZONTAL
2	11492.56	63.91	74.00	-10.09	55.30	5.11	38.78	35.28	Peak	104	181	HORIZONTAL

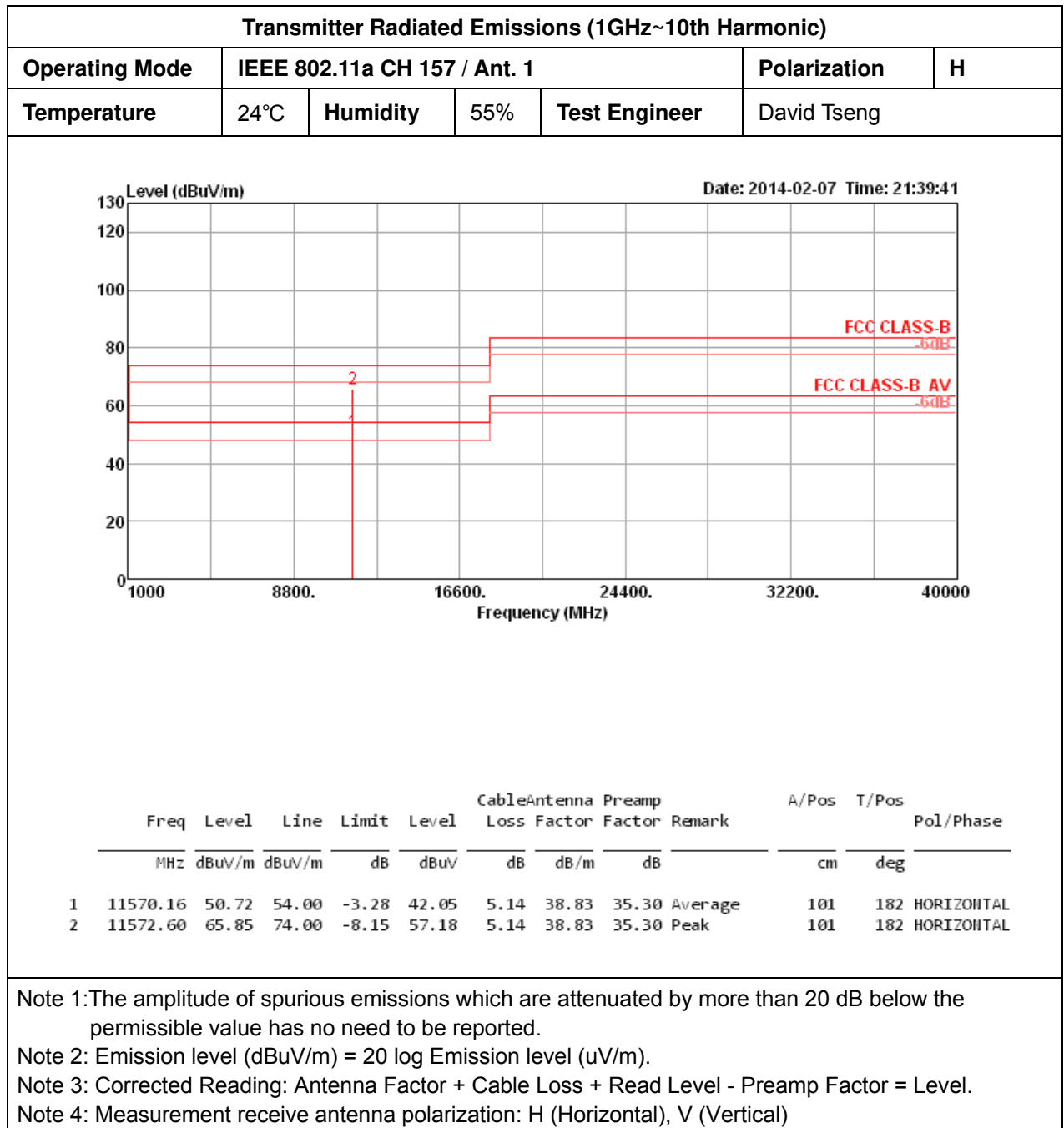
Note 1: The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

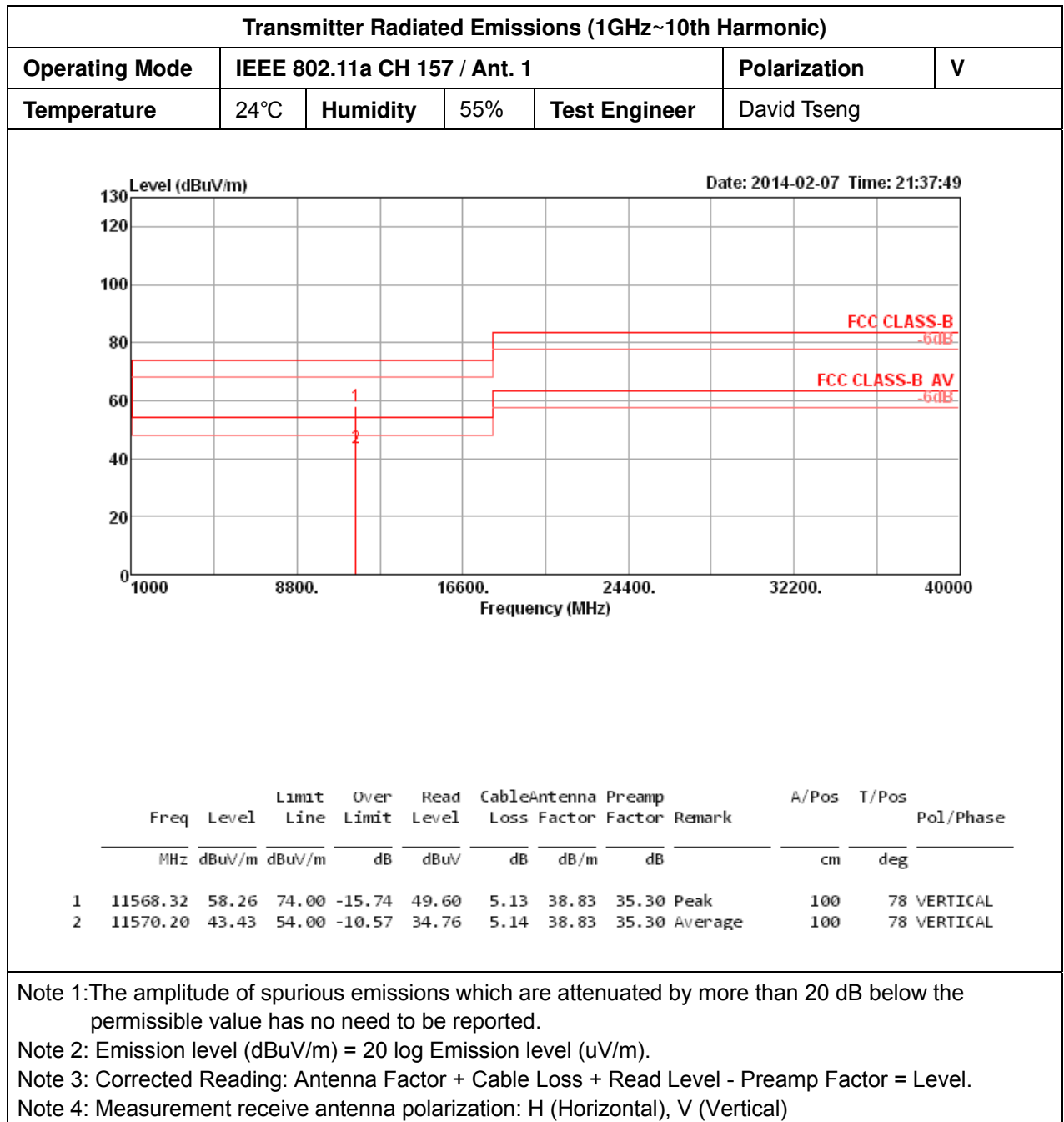
Note 2: Emission level (dBuV/m) = 20 log Emission level (uV/m).

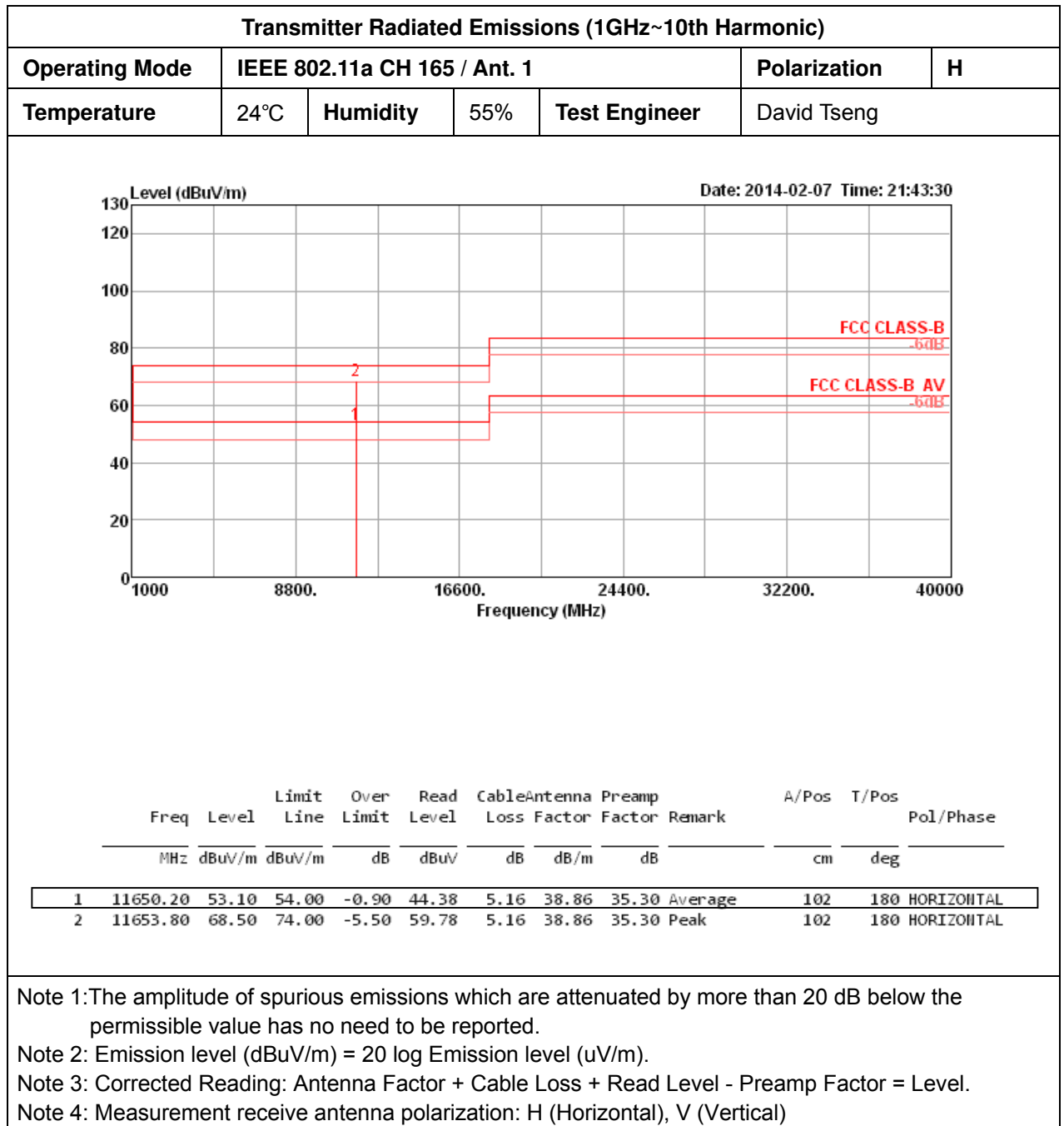
Note 3: Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

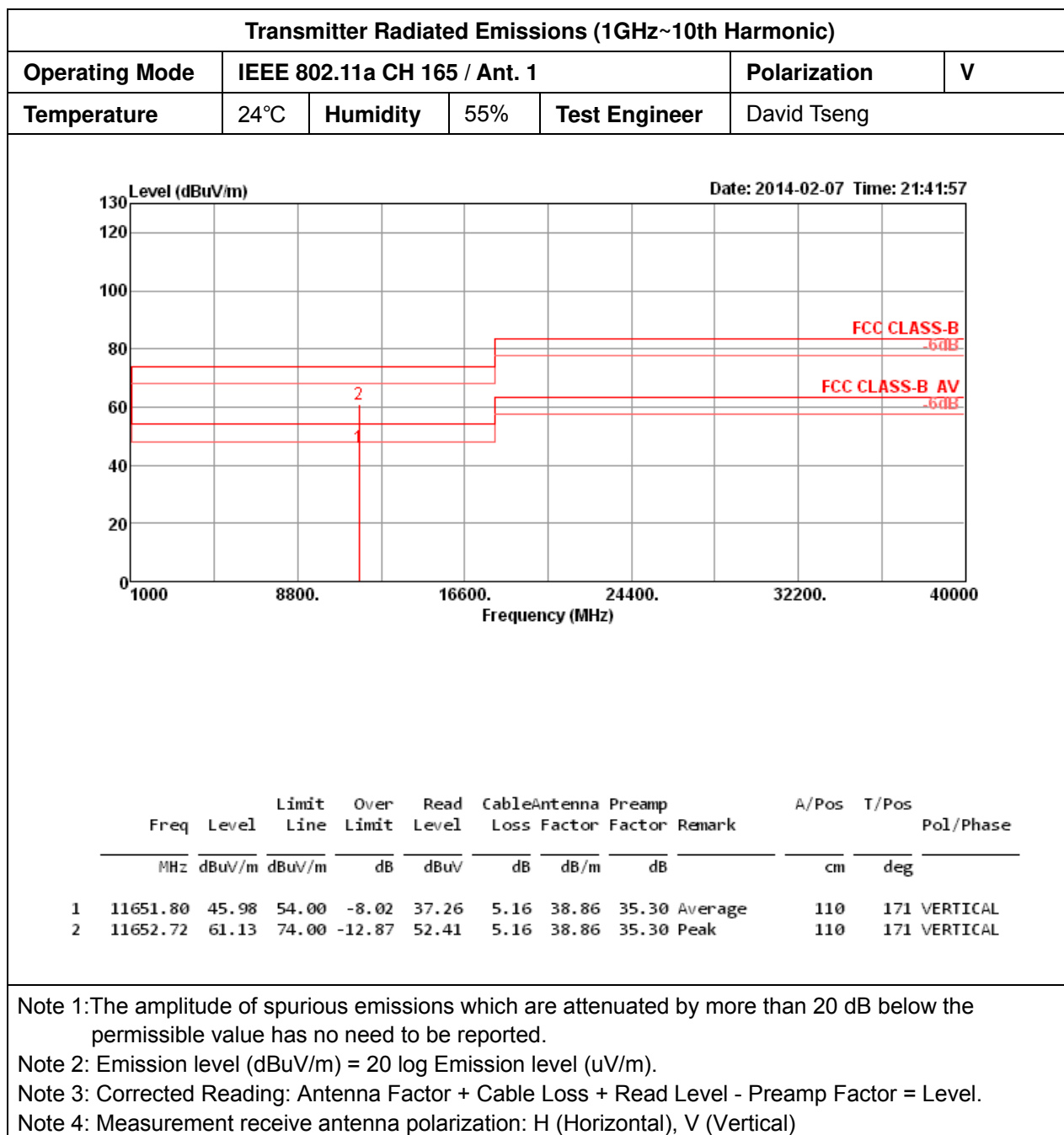
Note 4: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

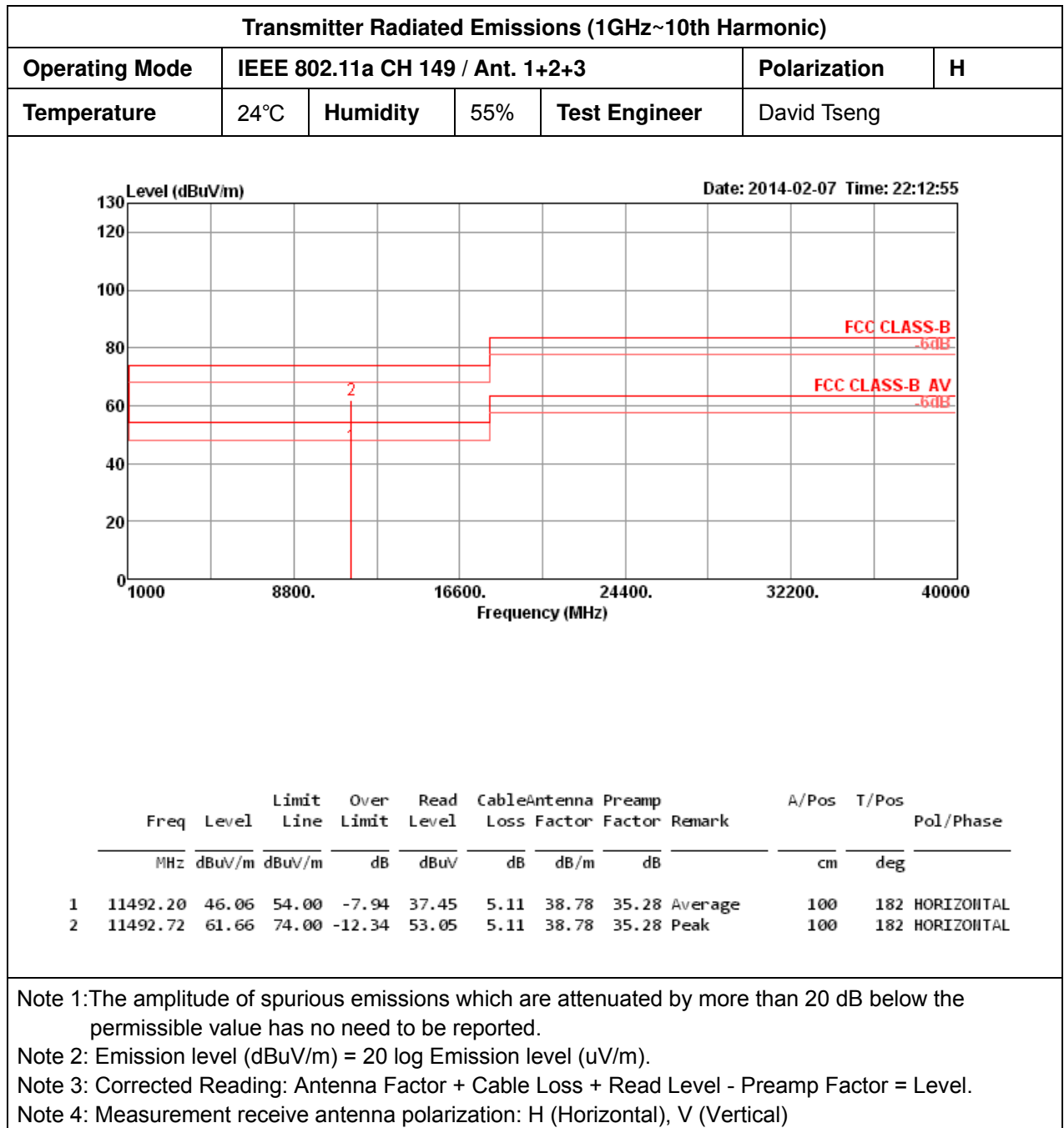


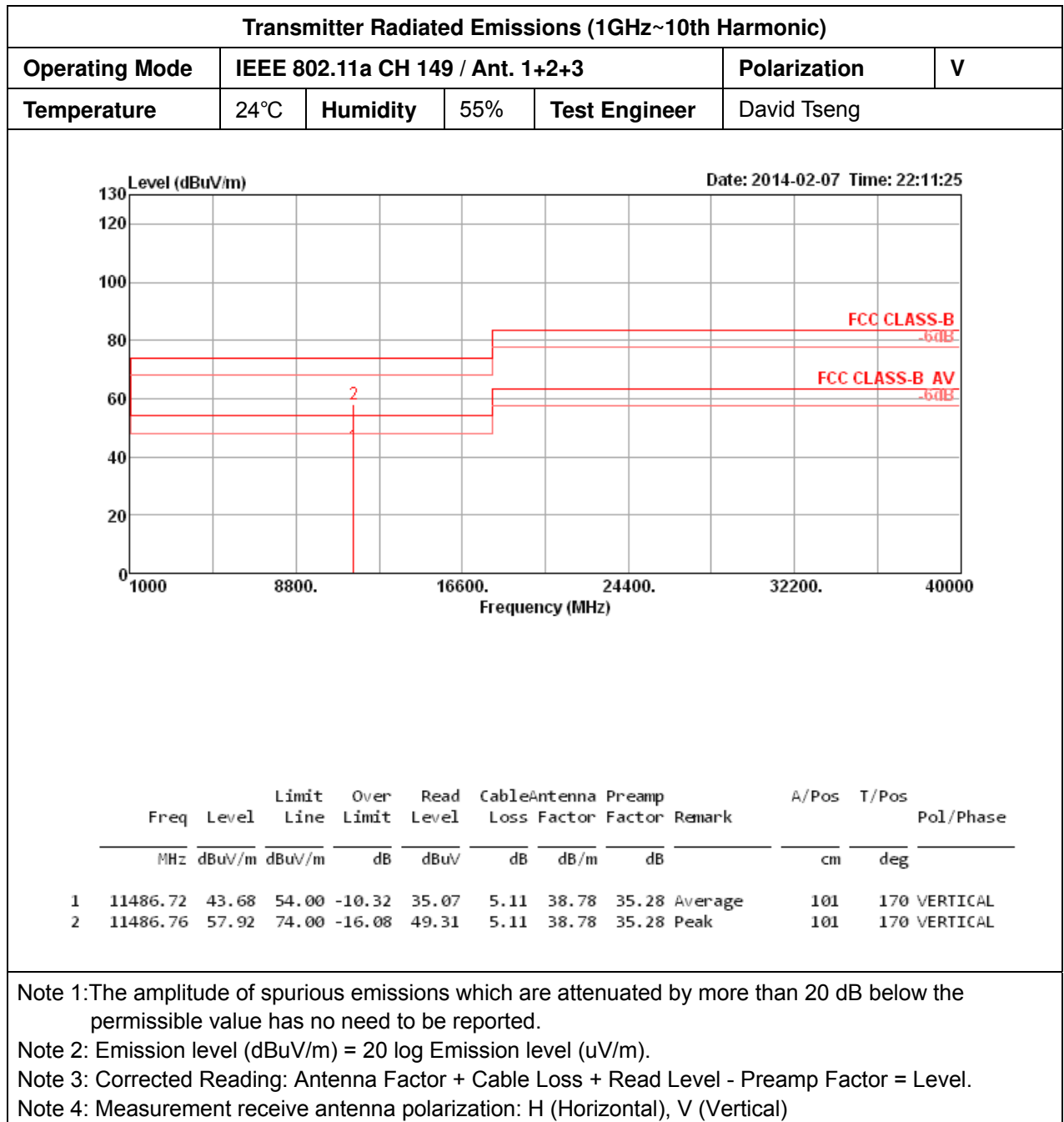


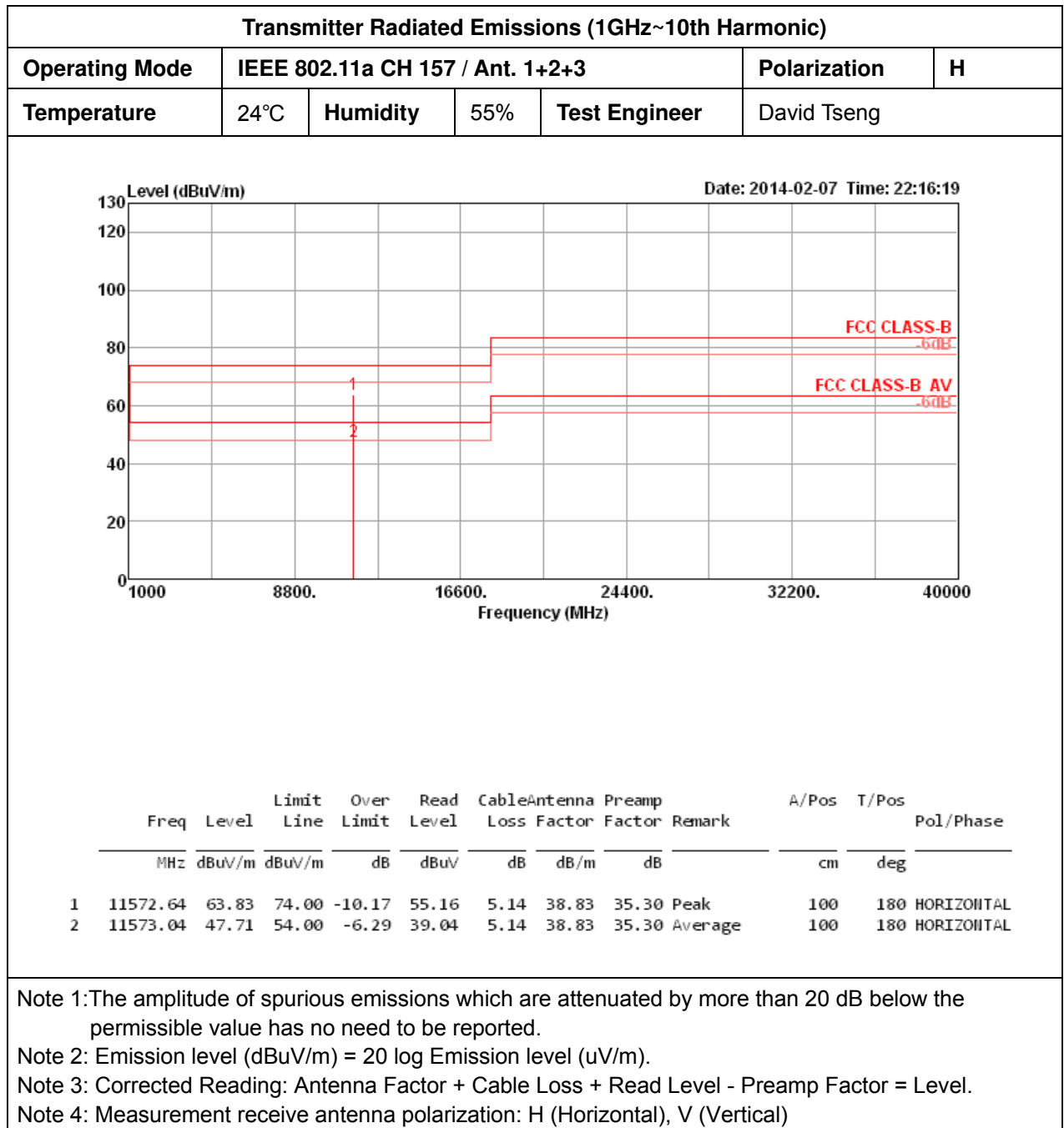


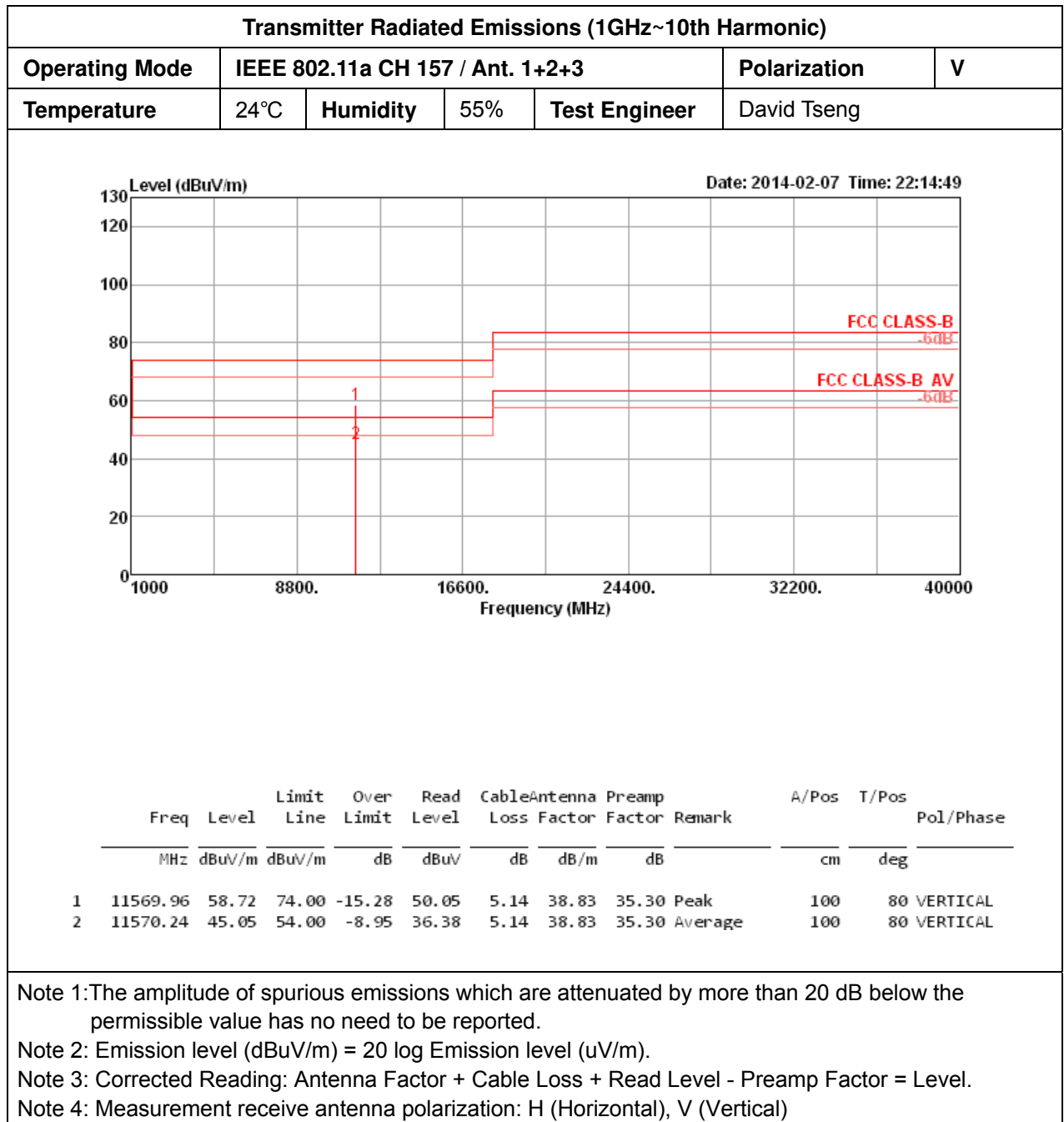


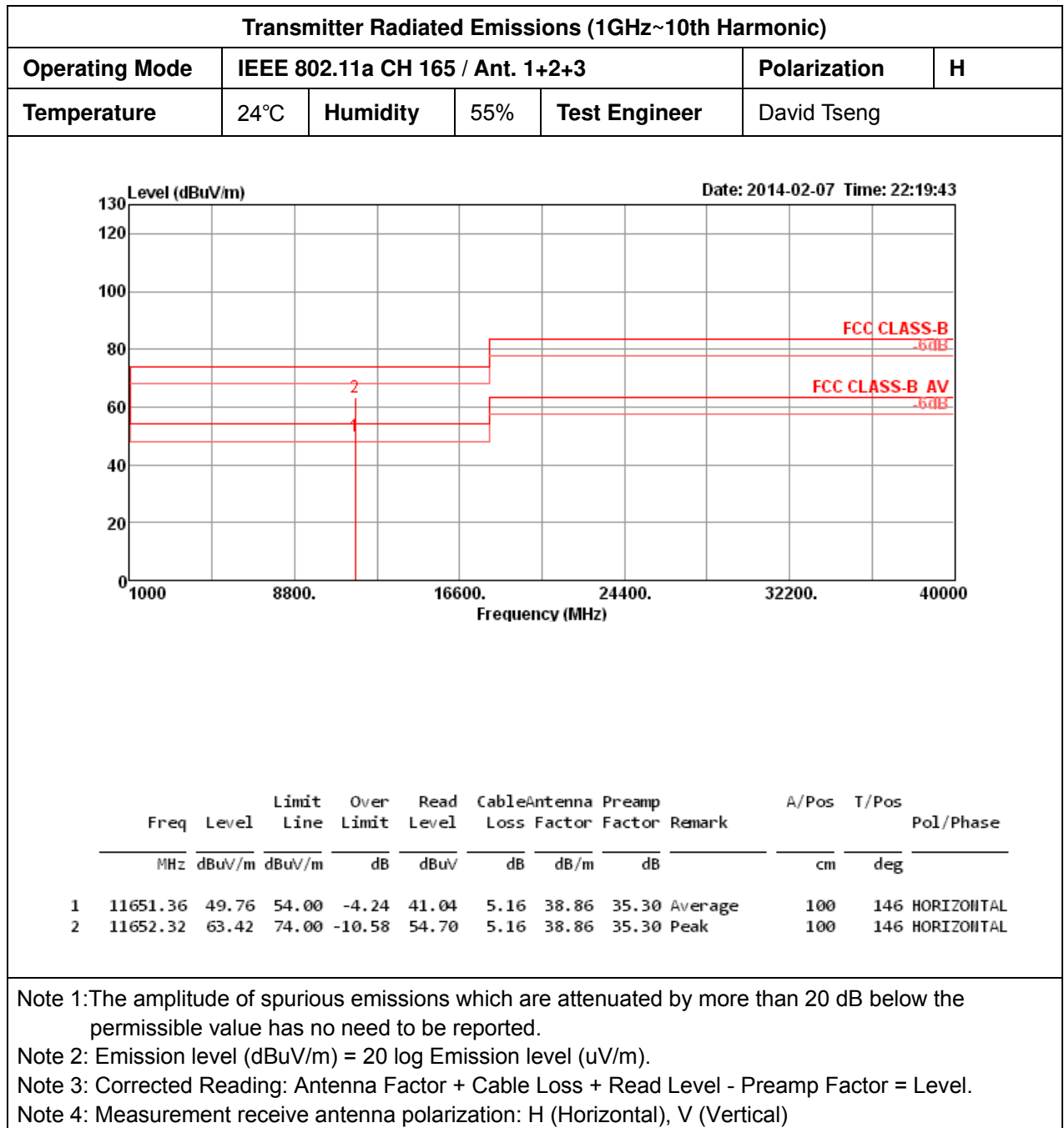


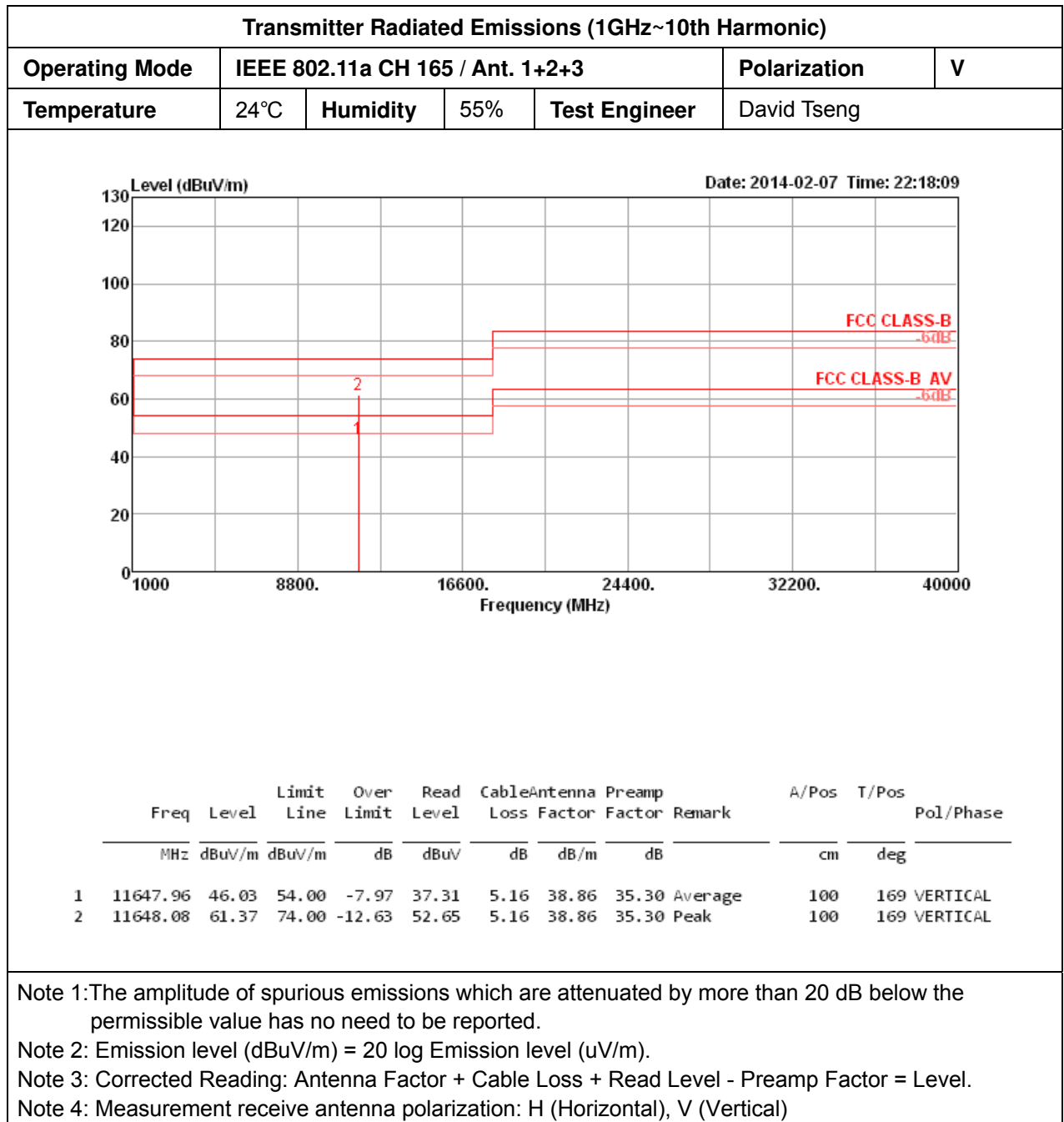


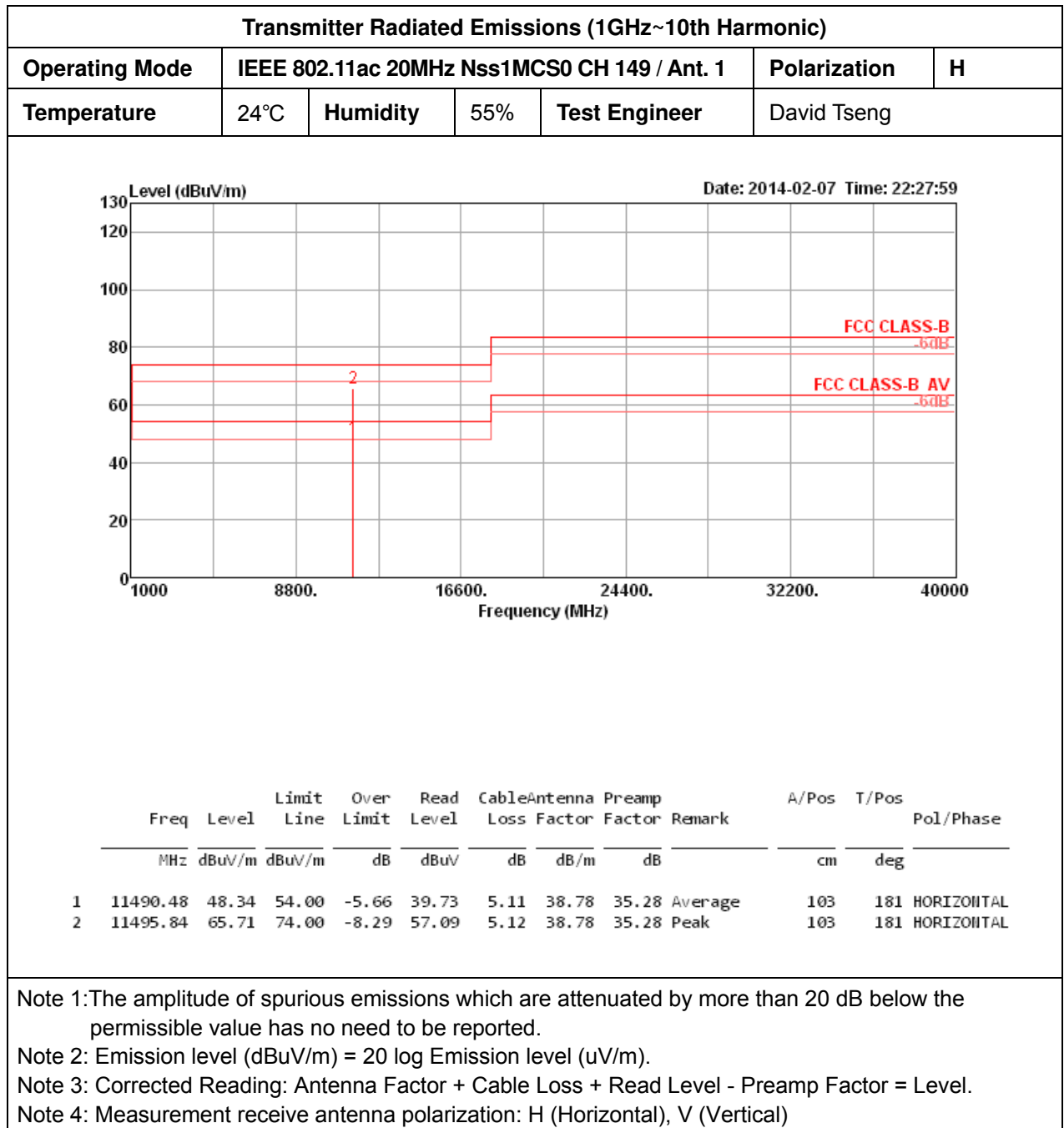


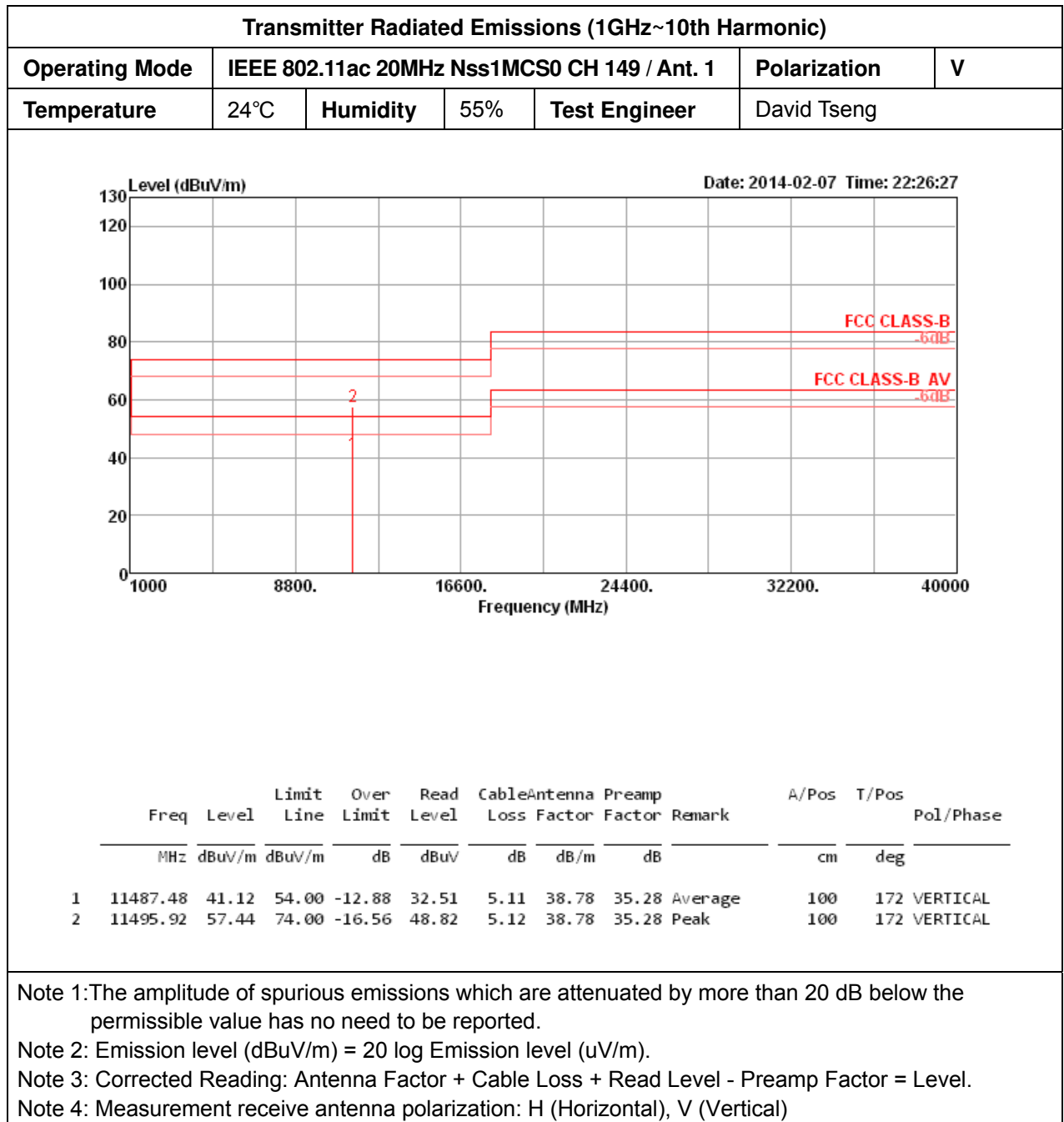


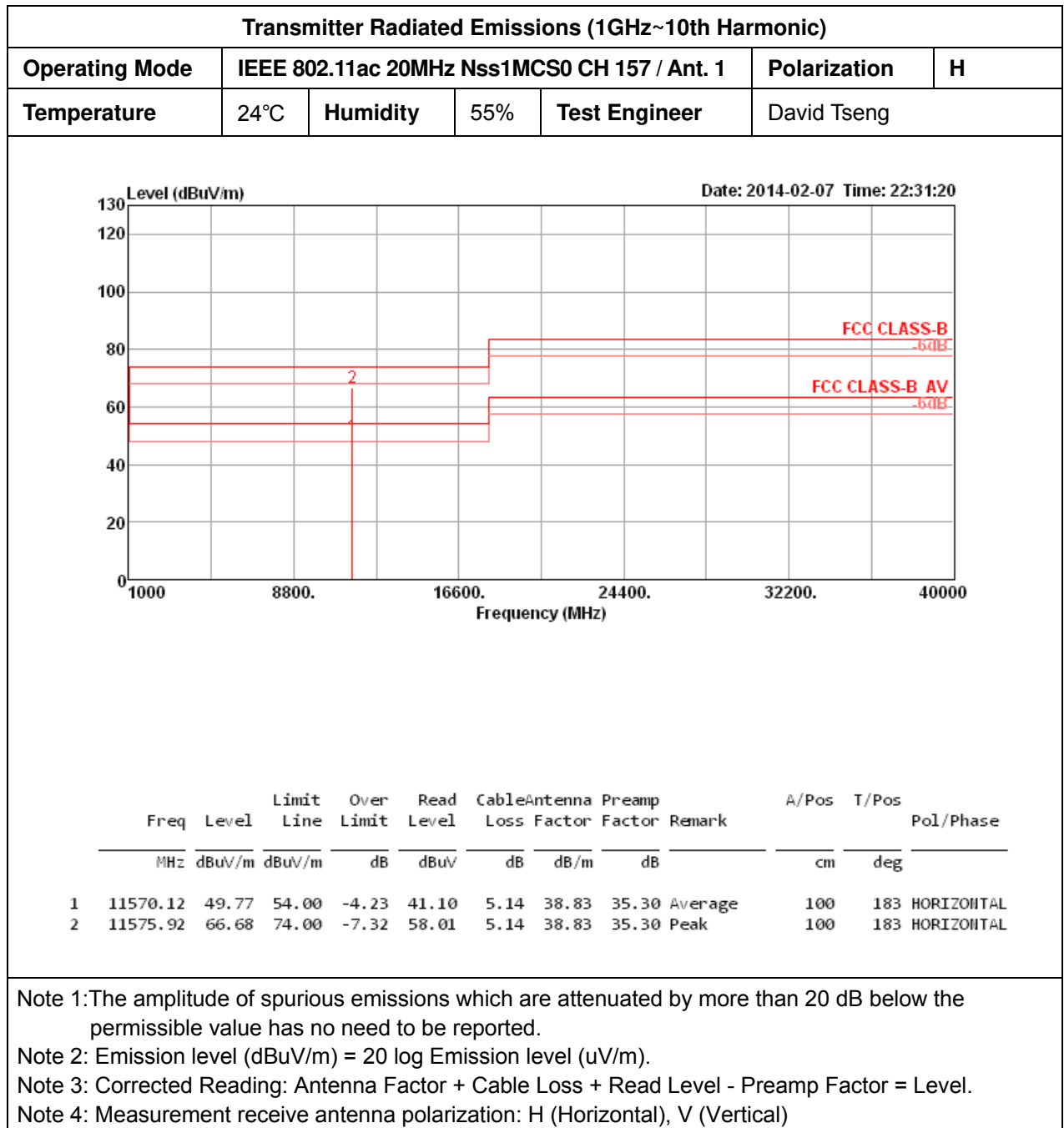


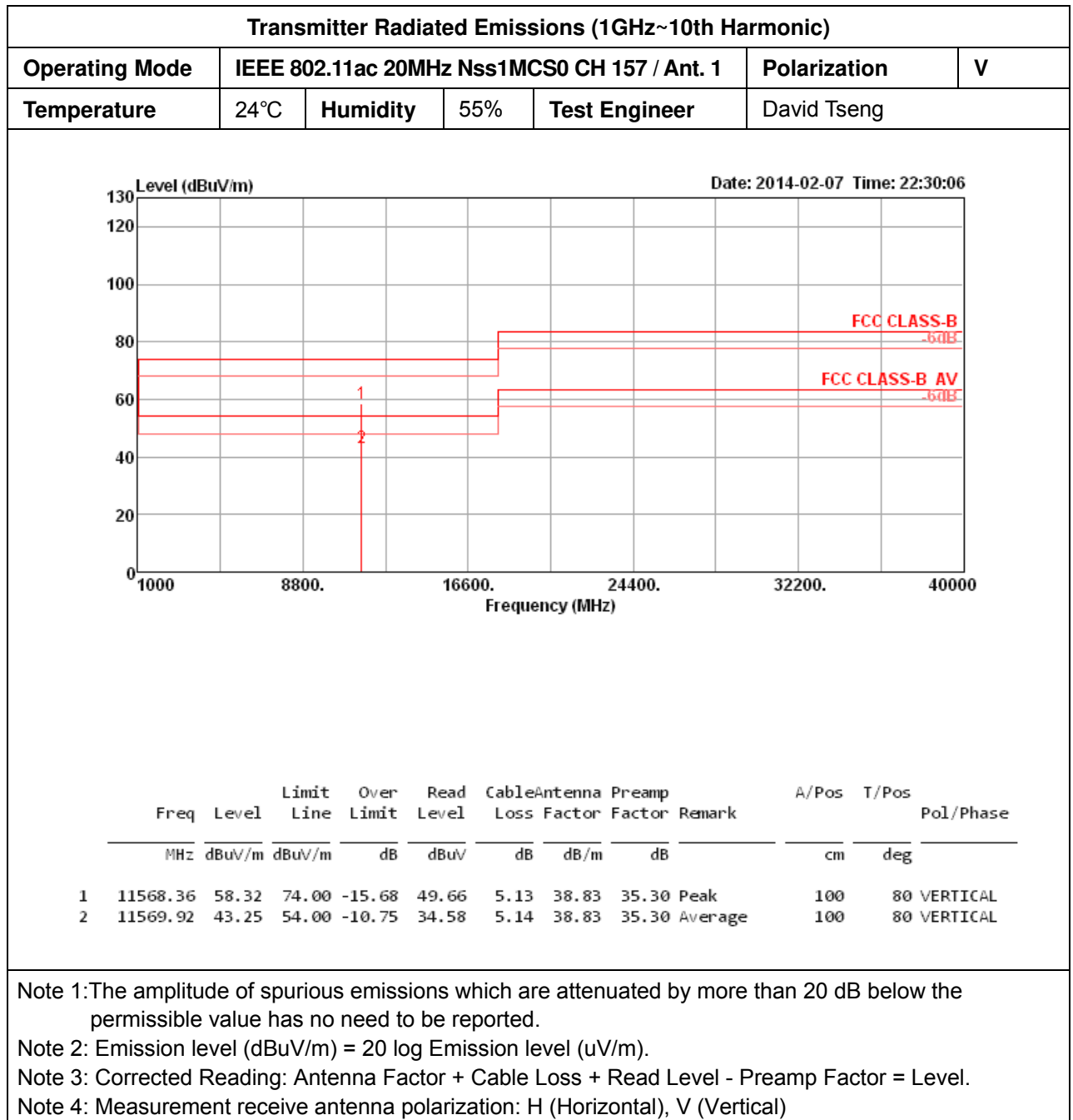


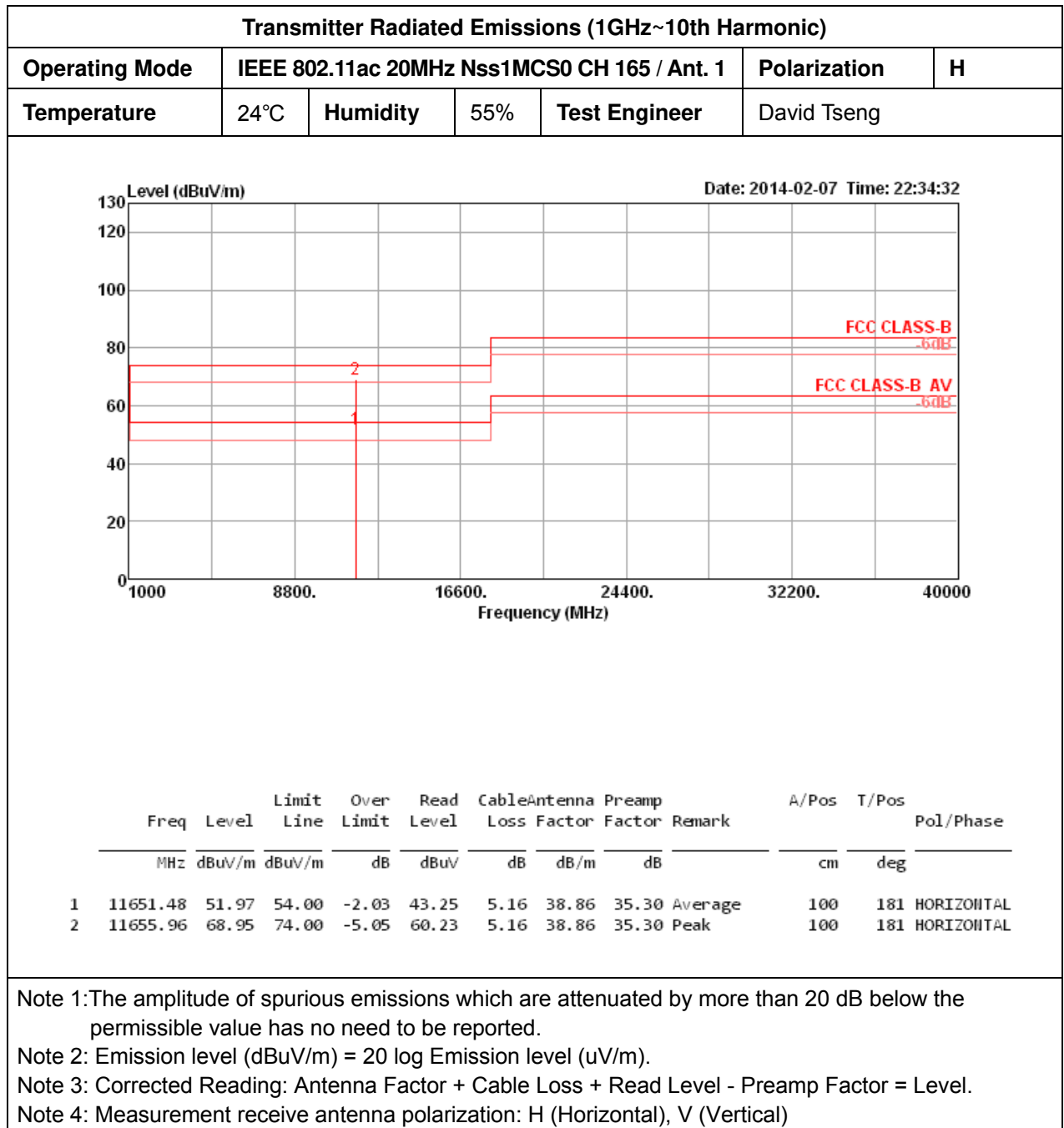


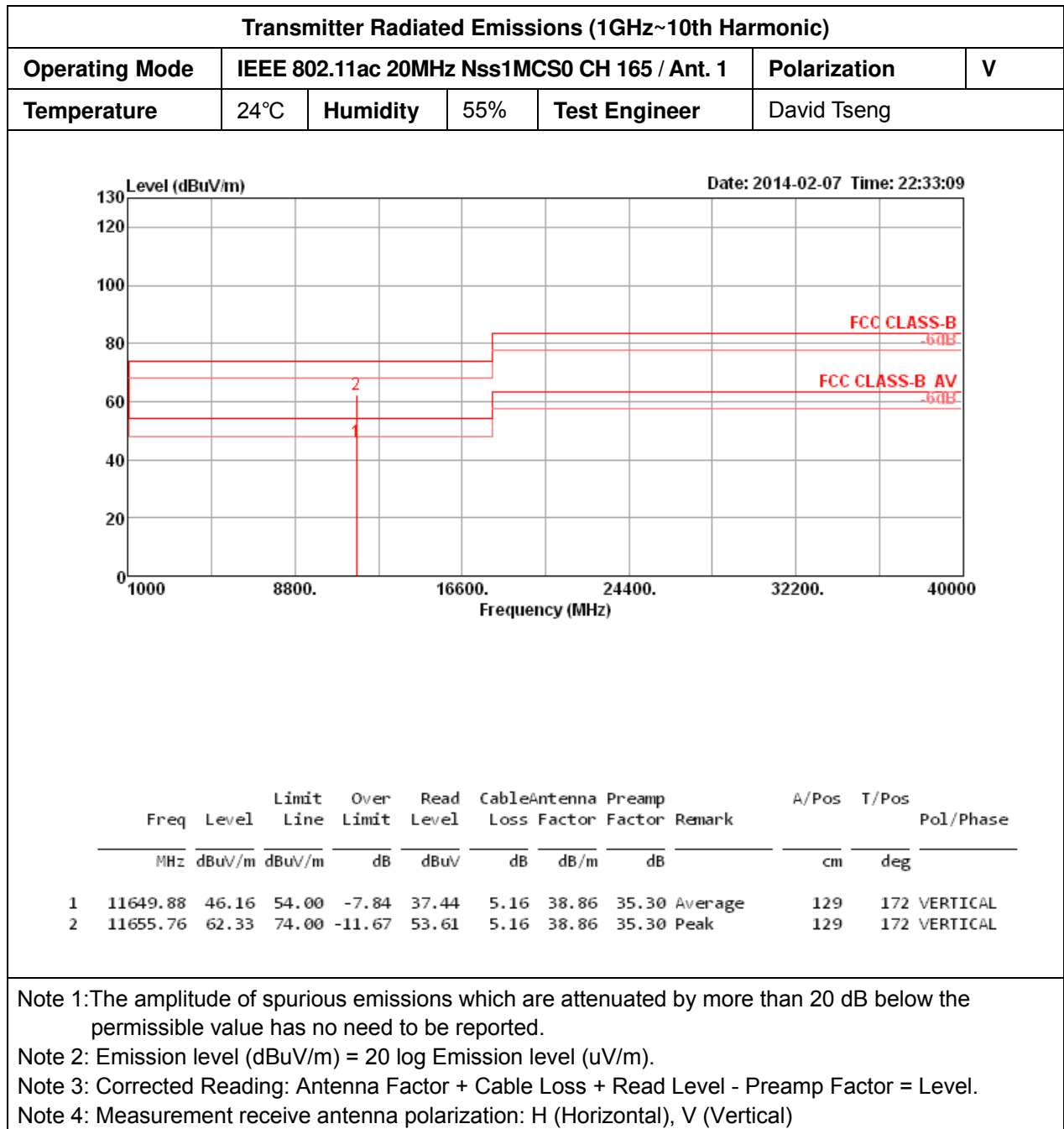


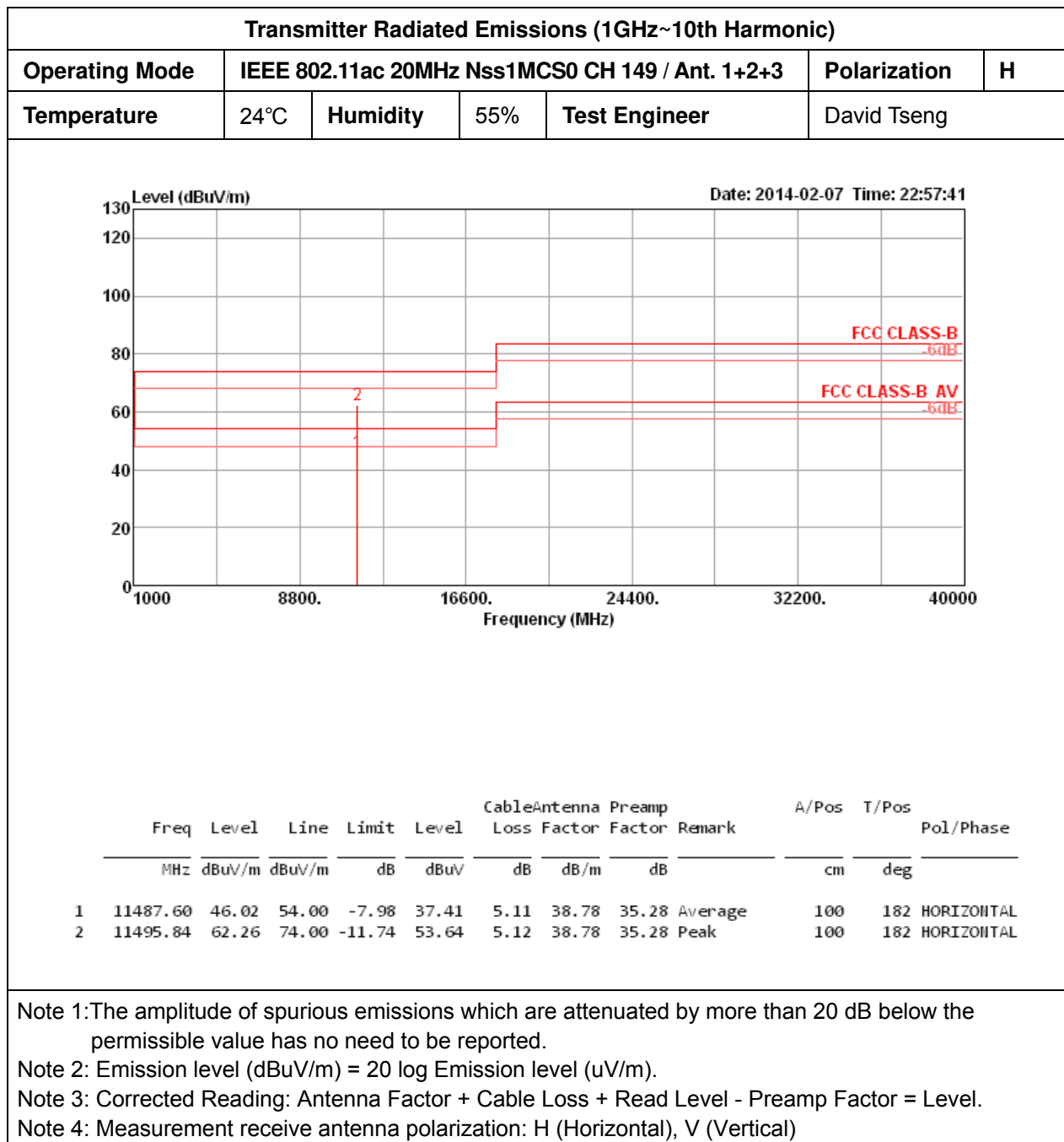


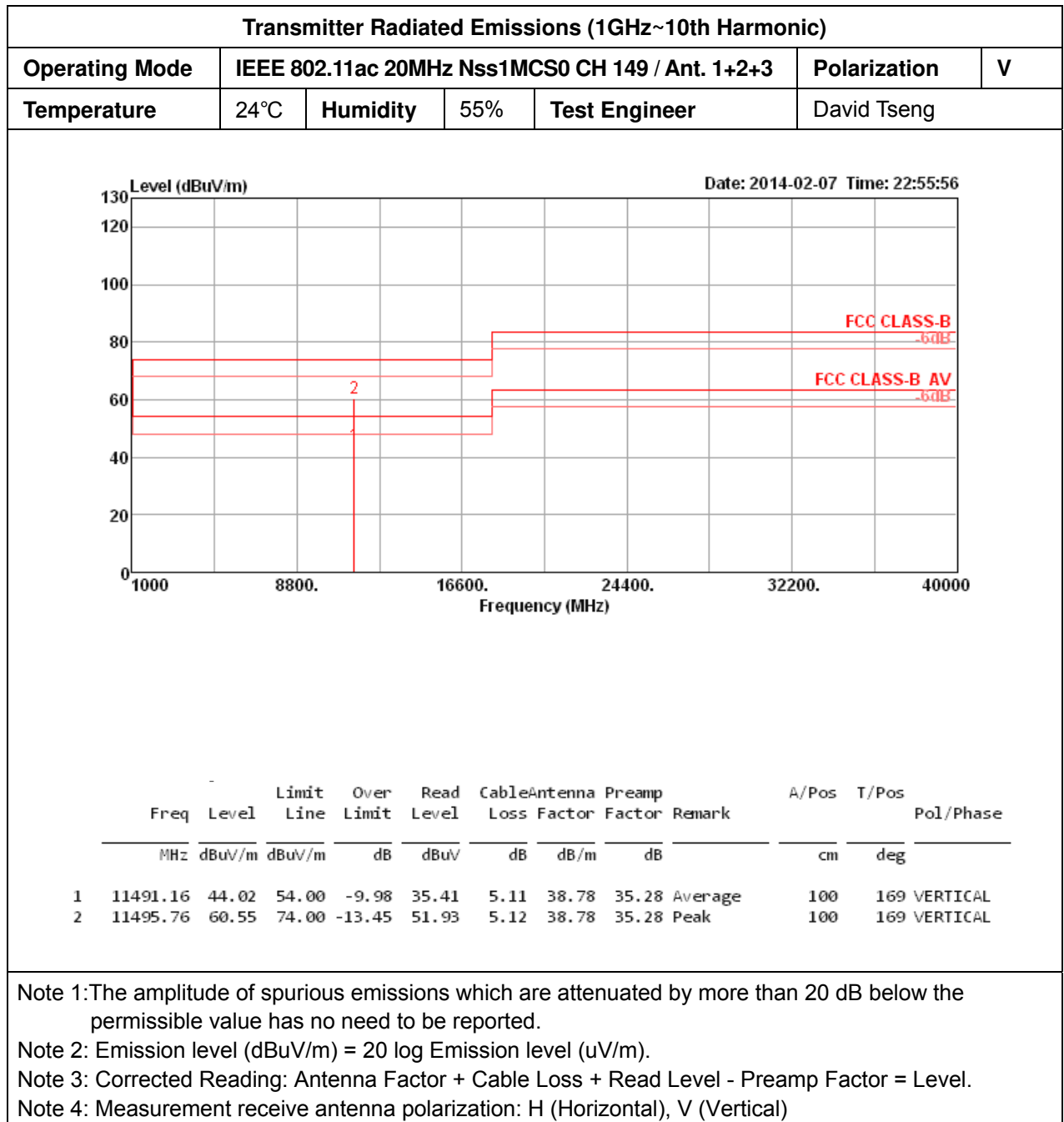


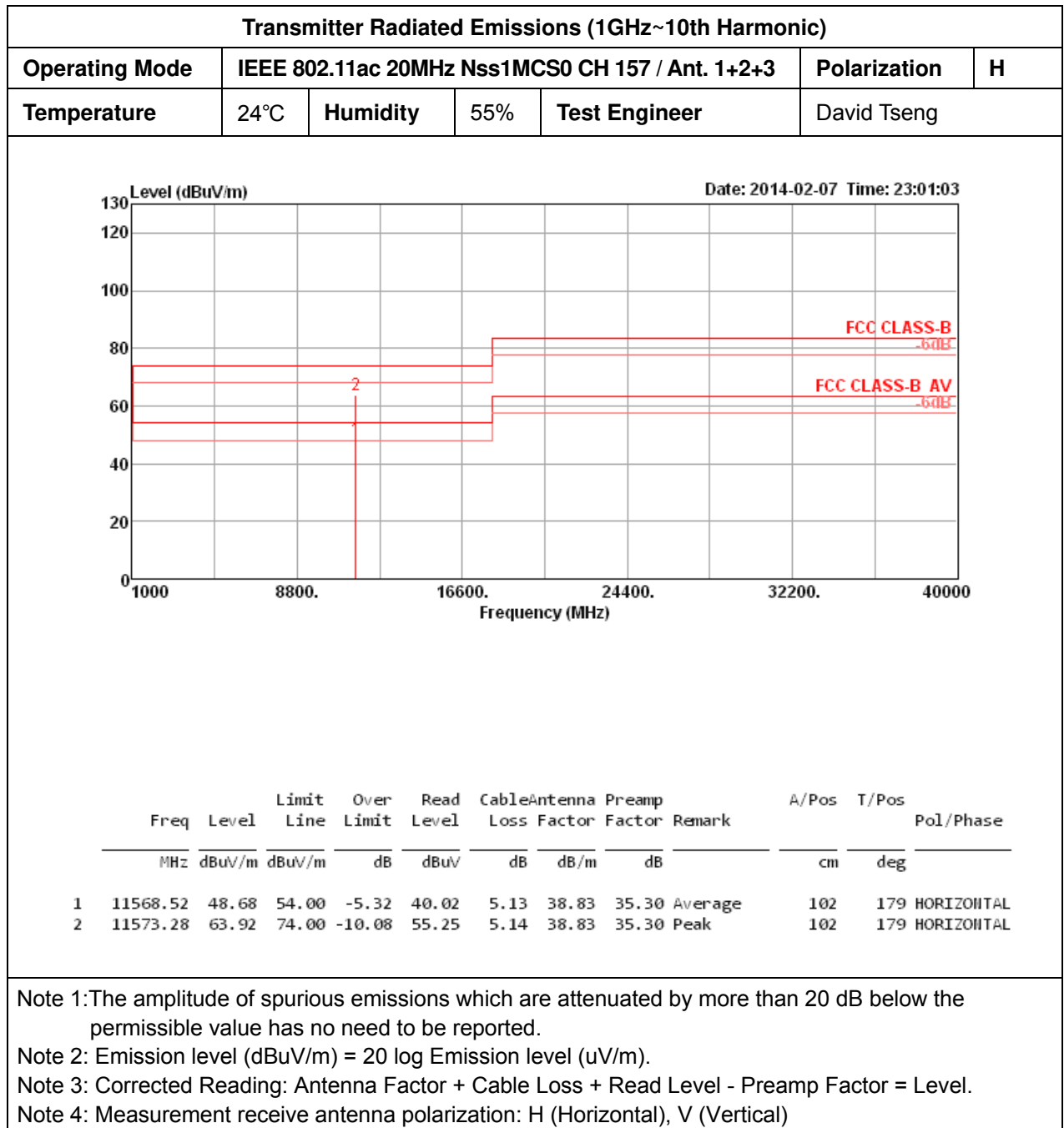


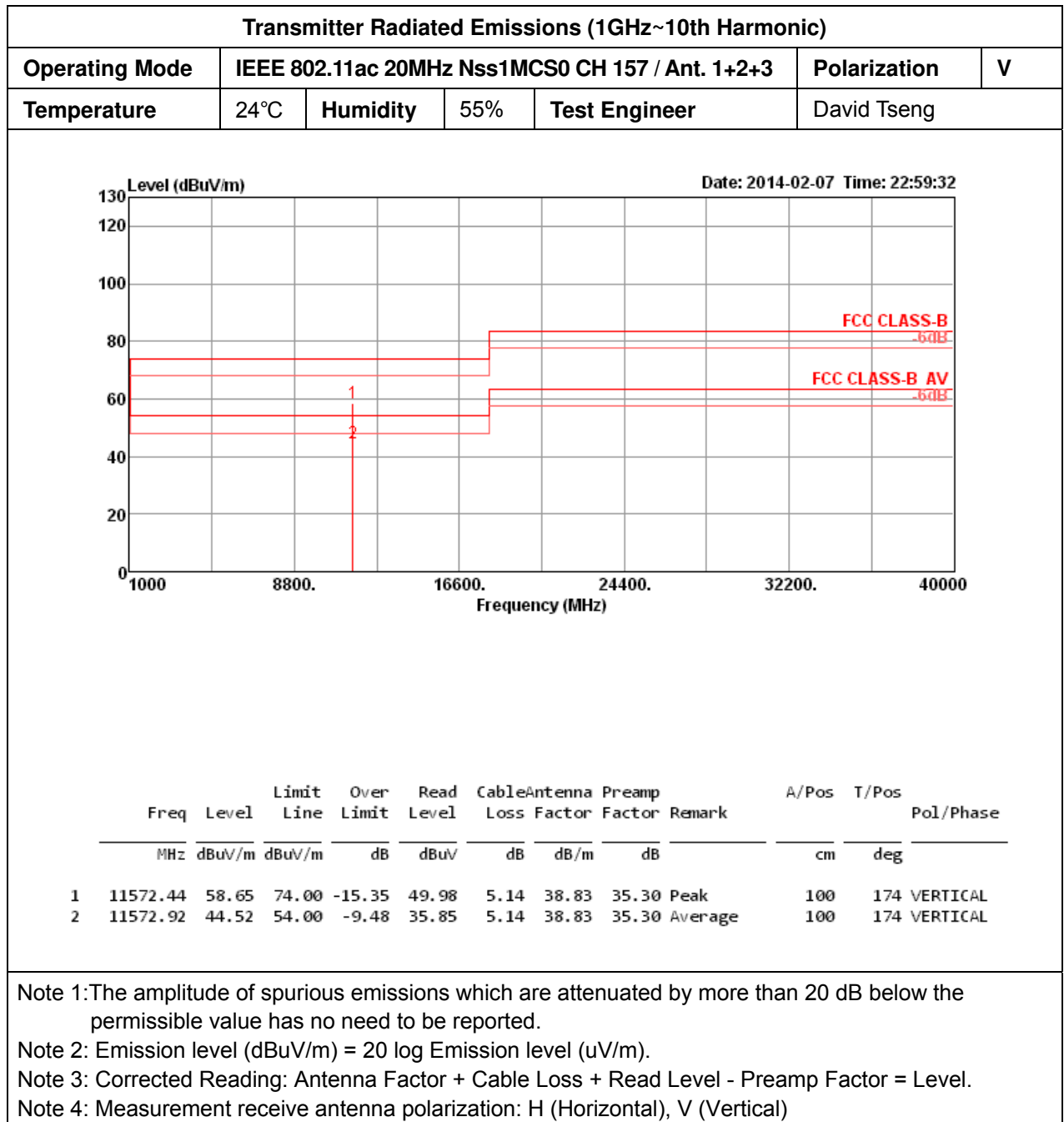


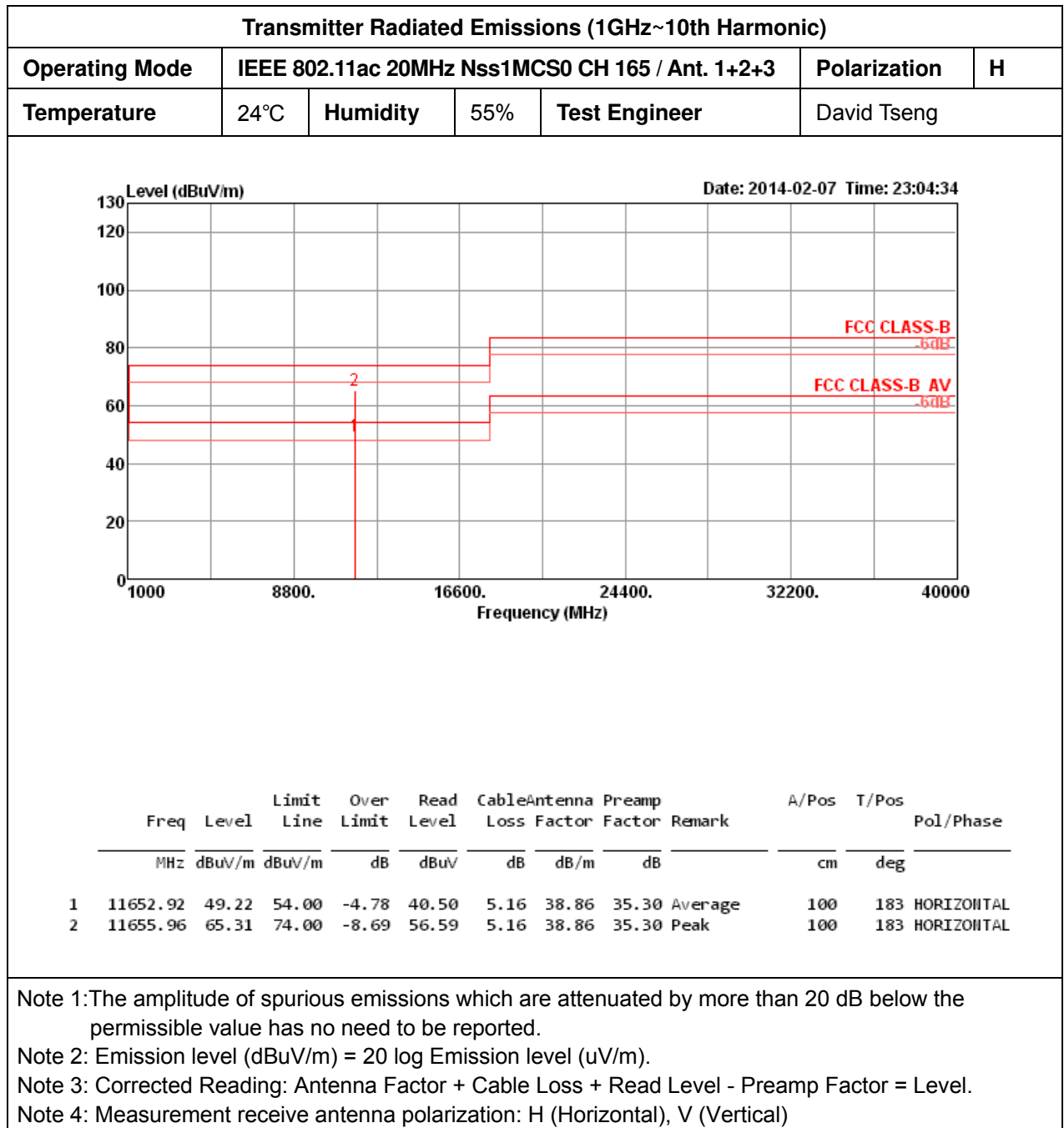


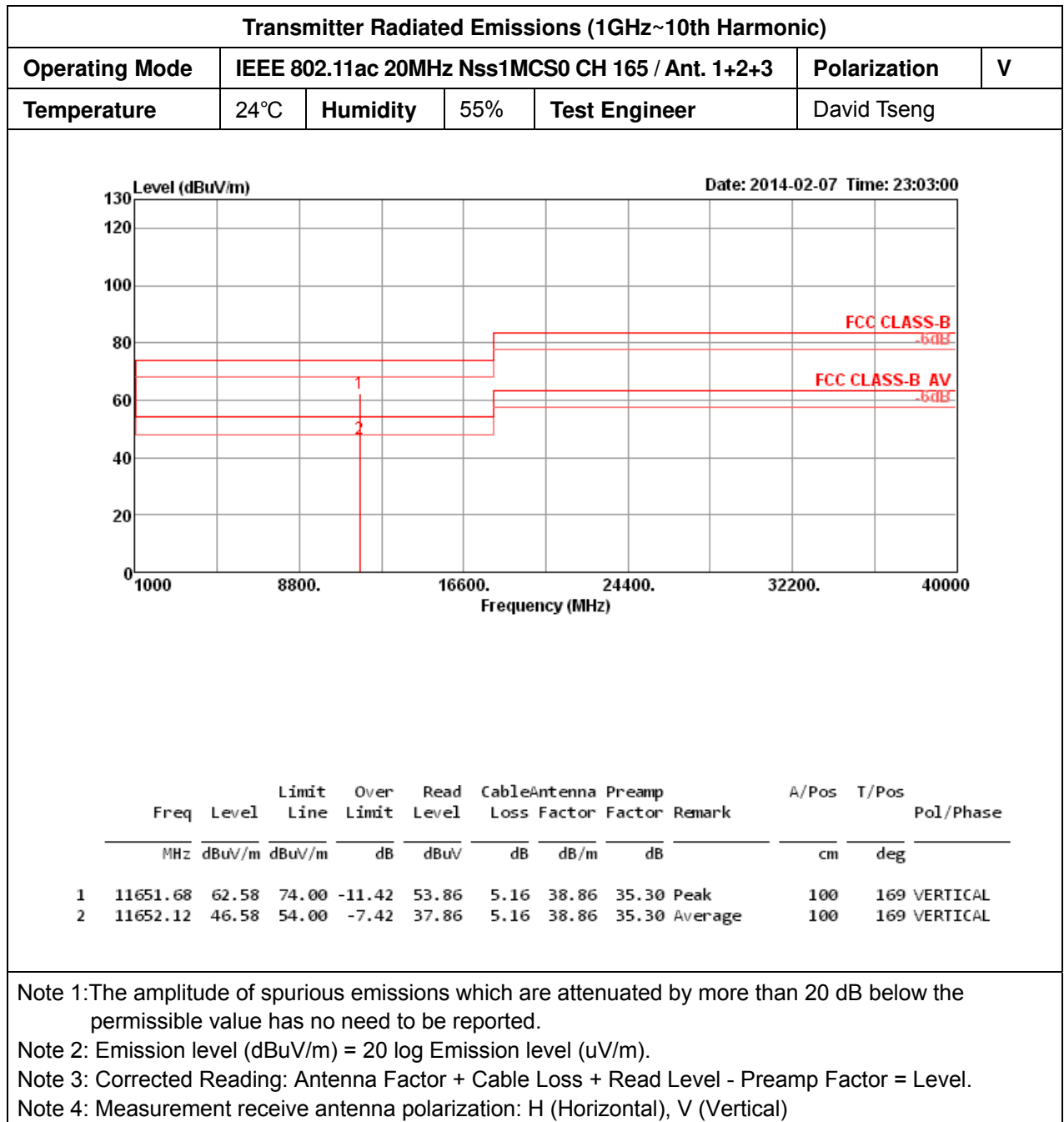


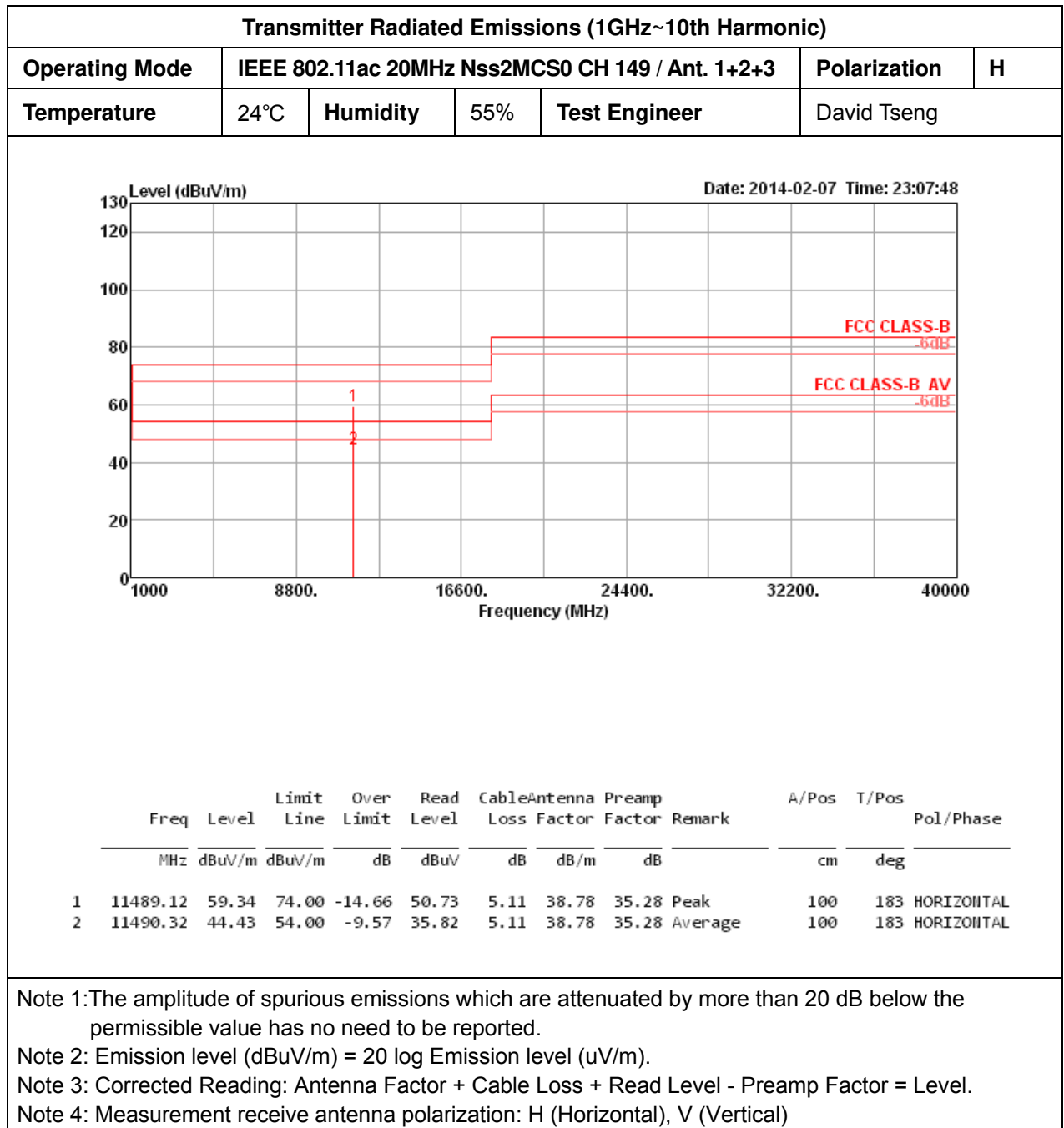


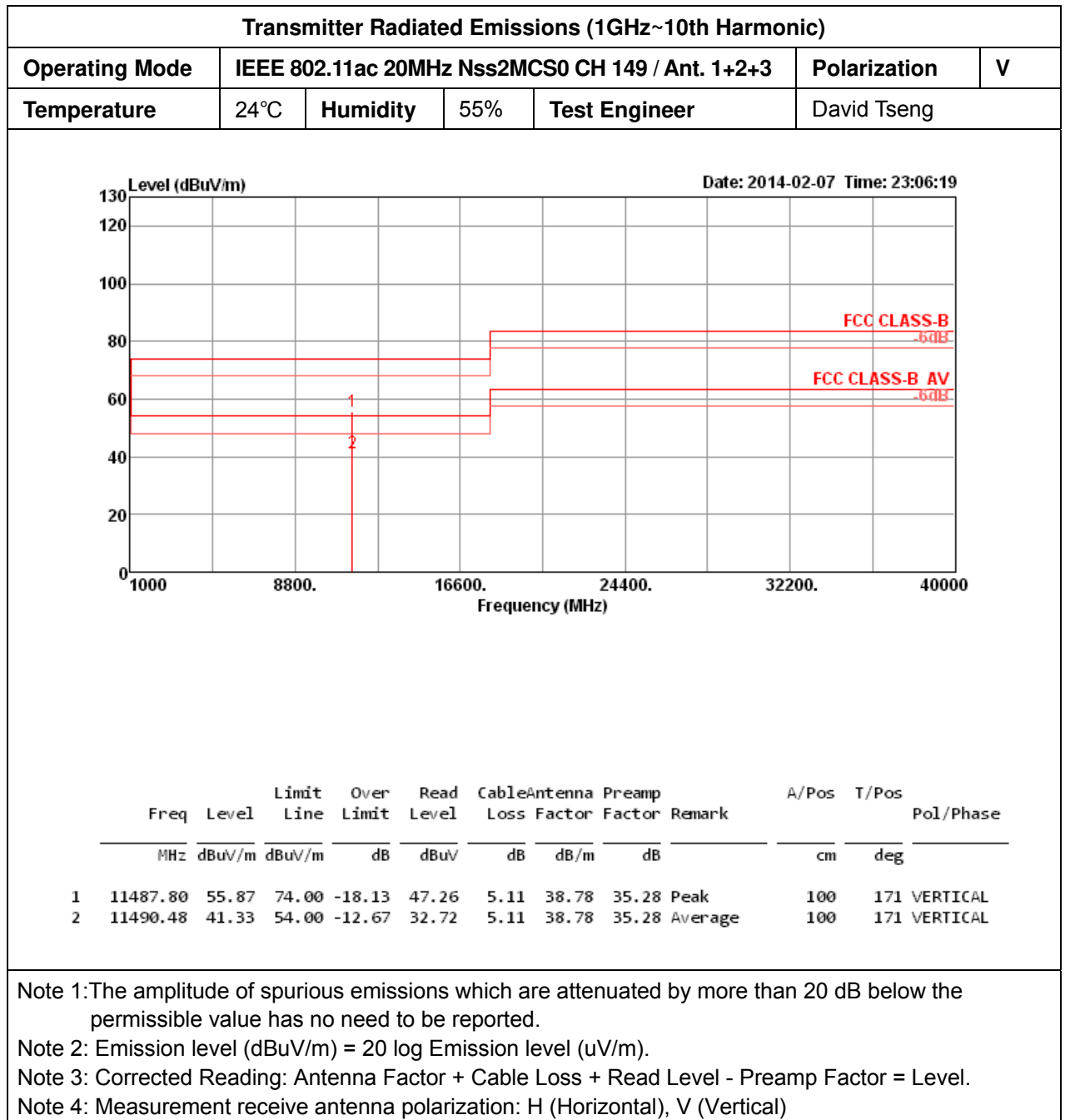


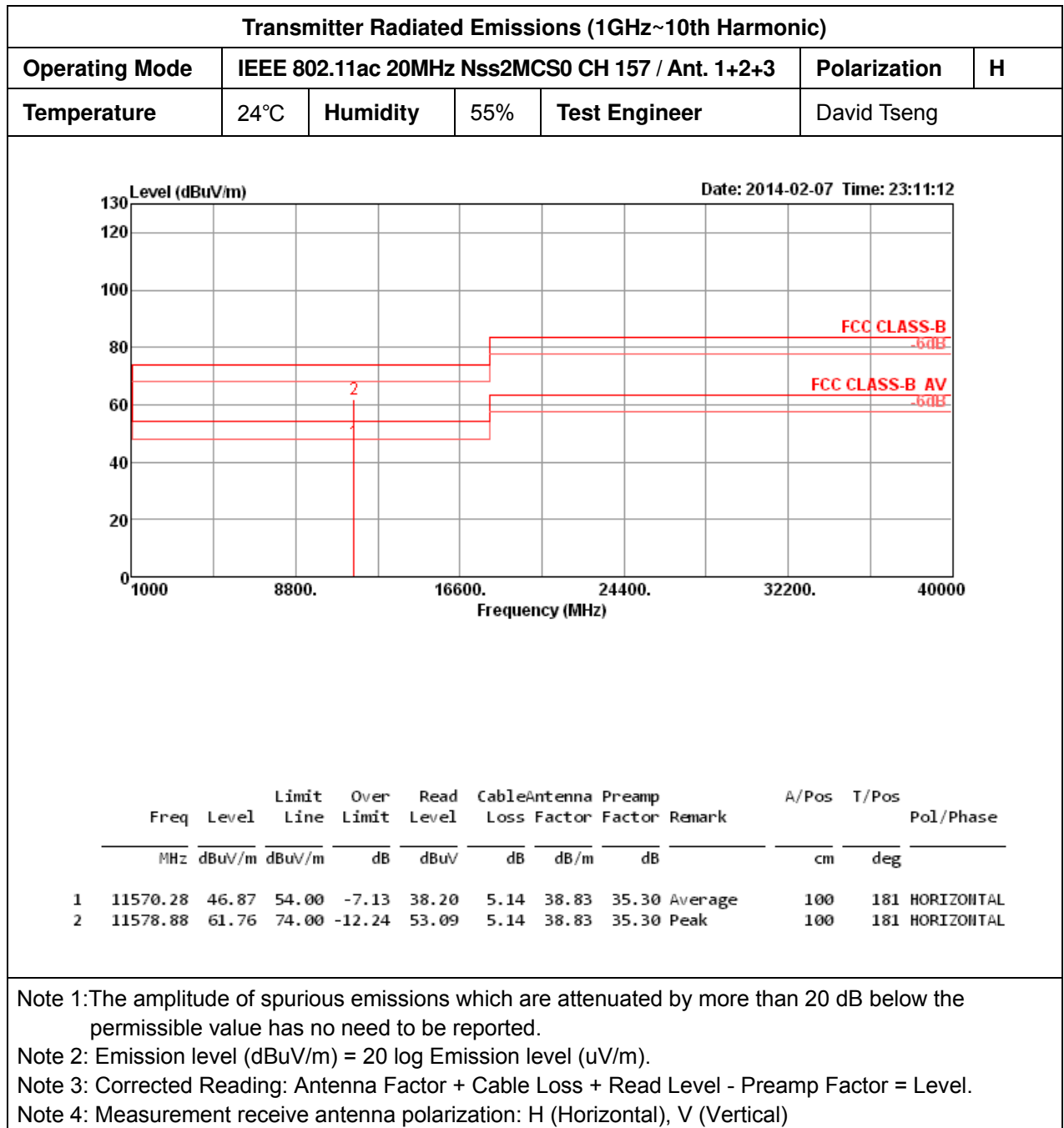


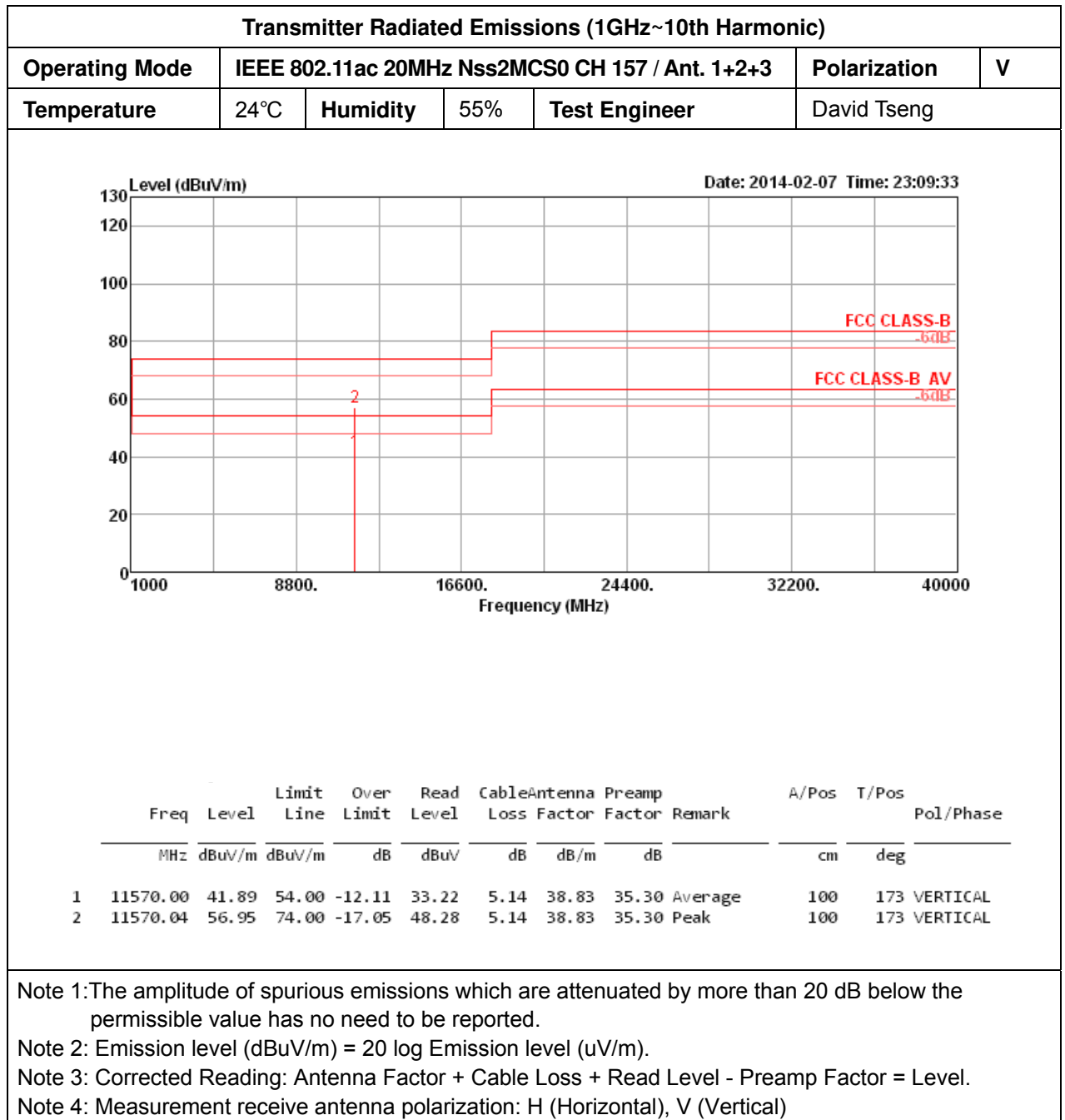


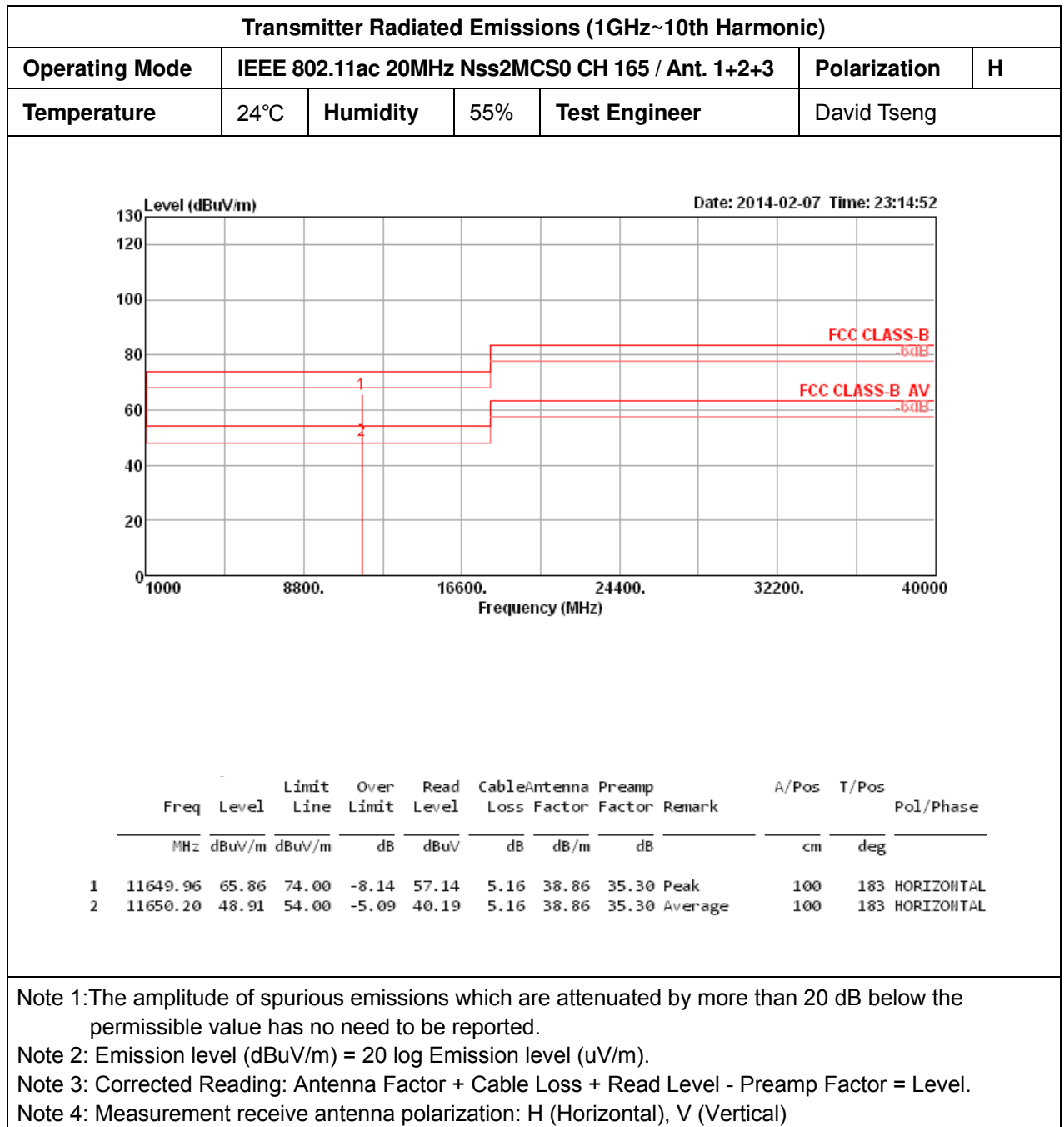


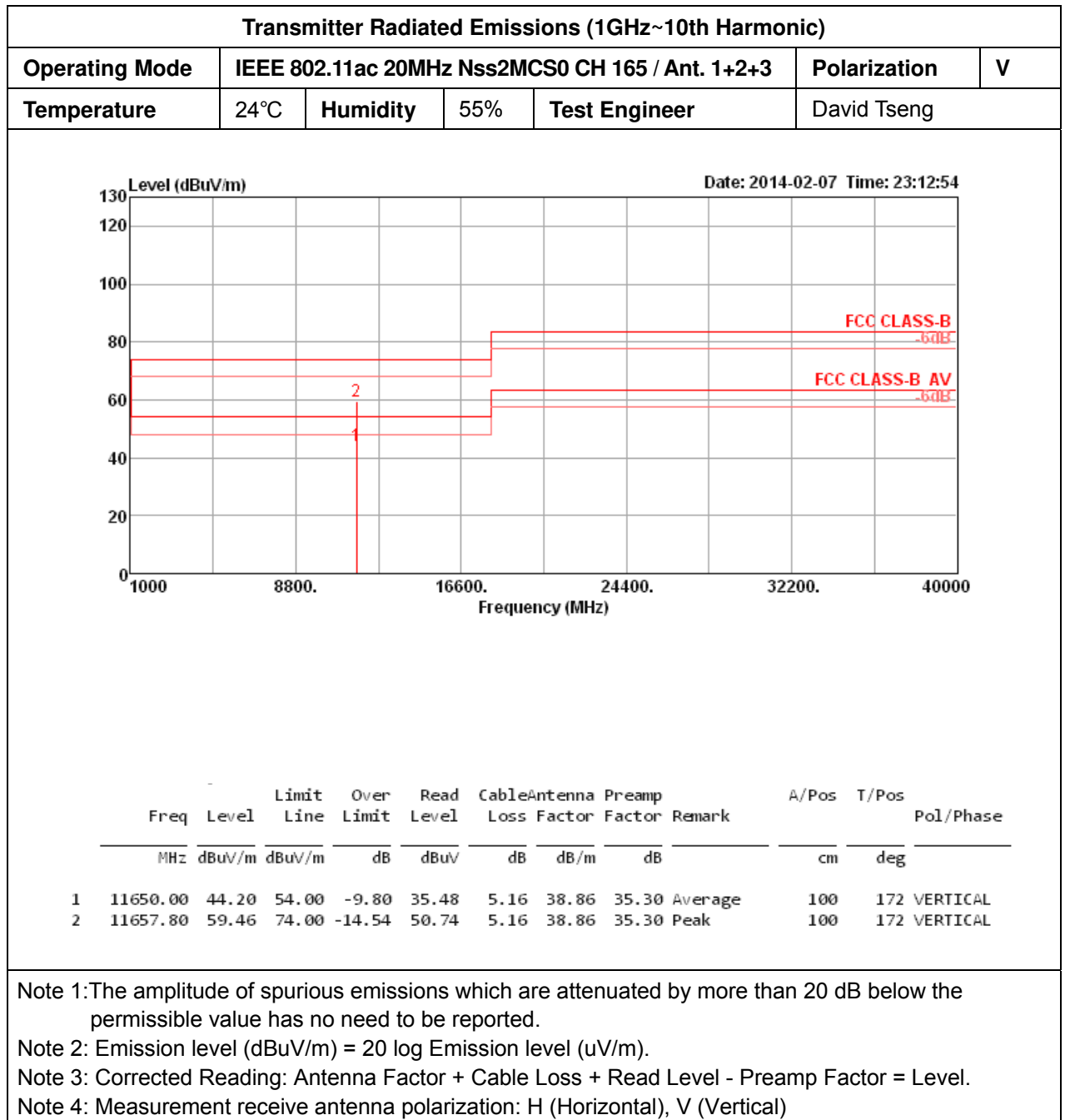


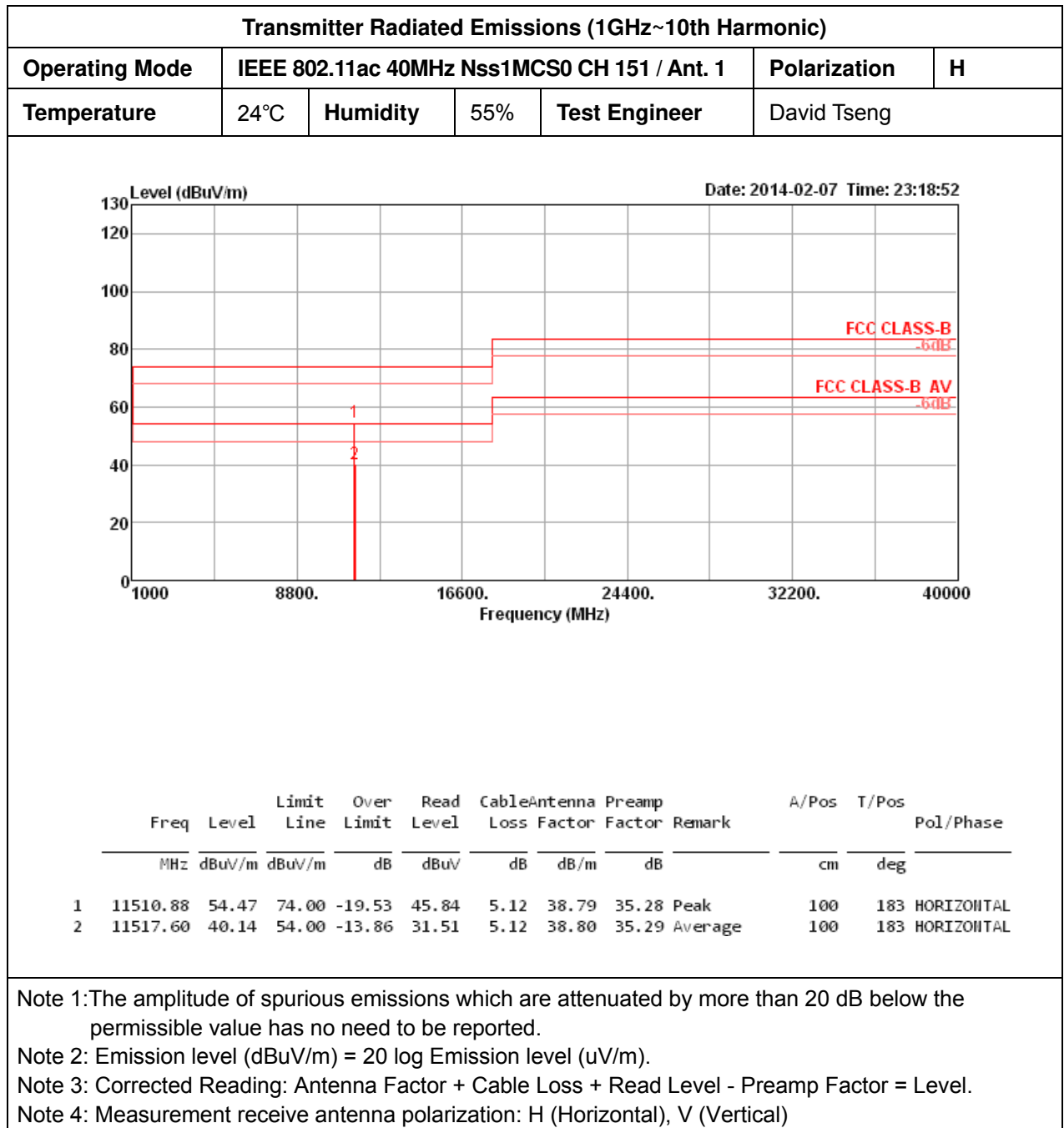


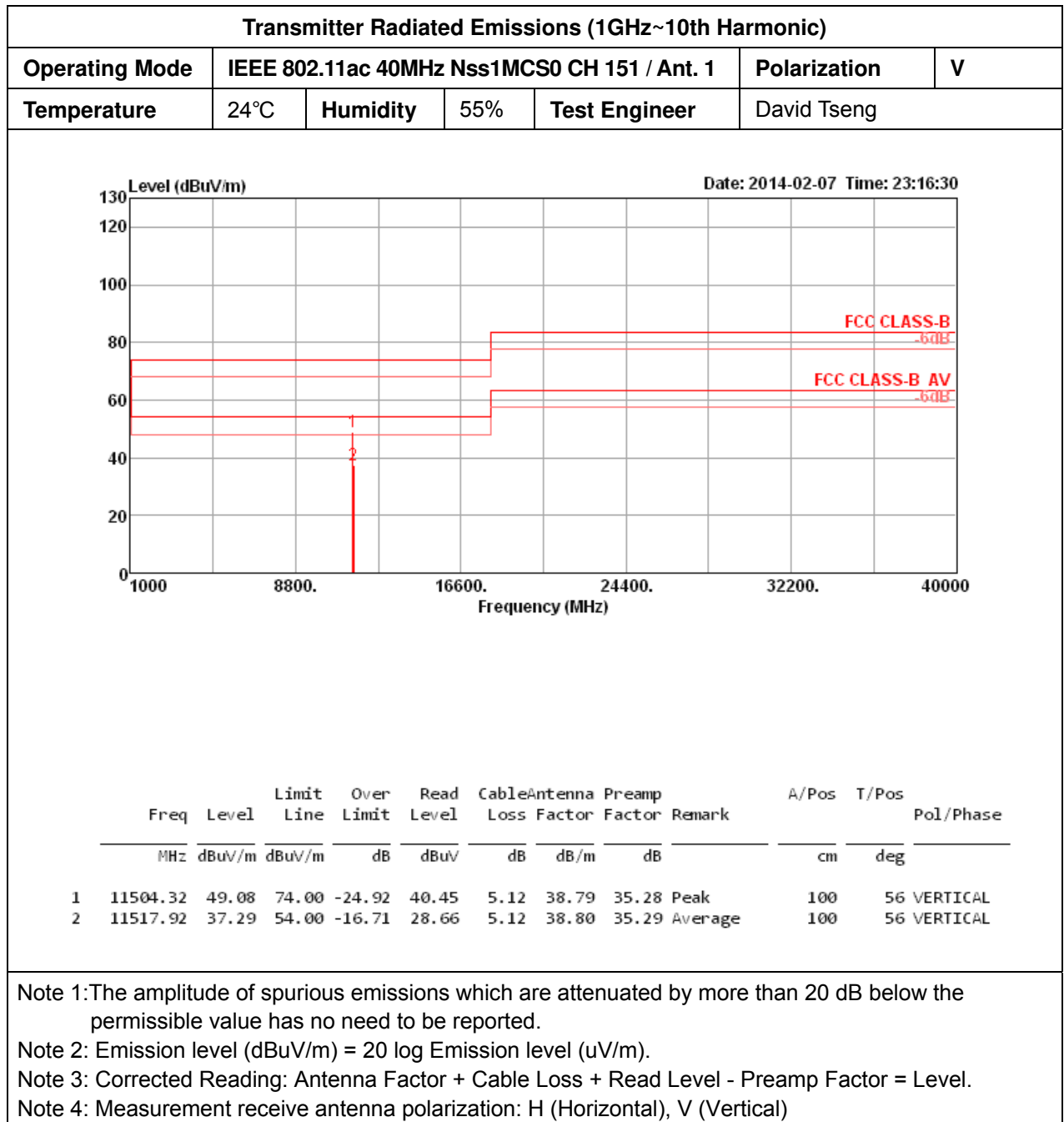


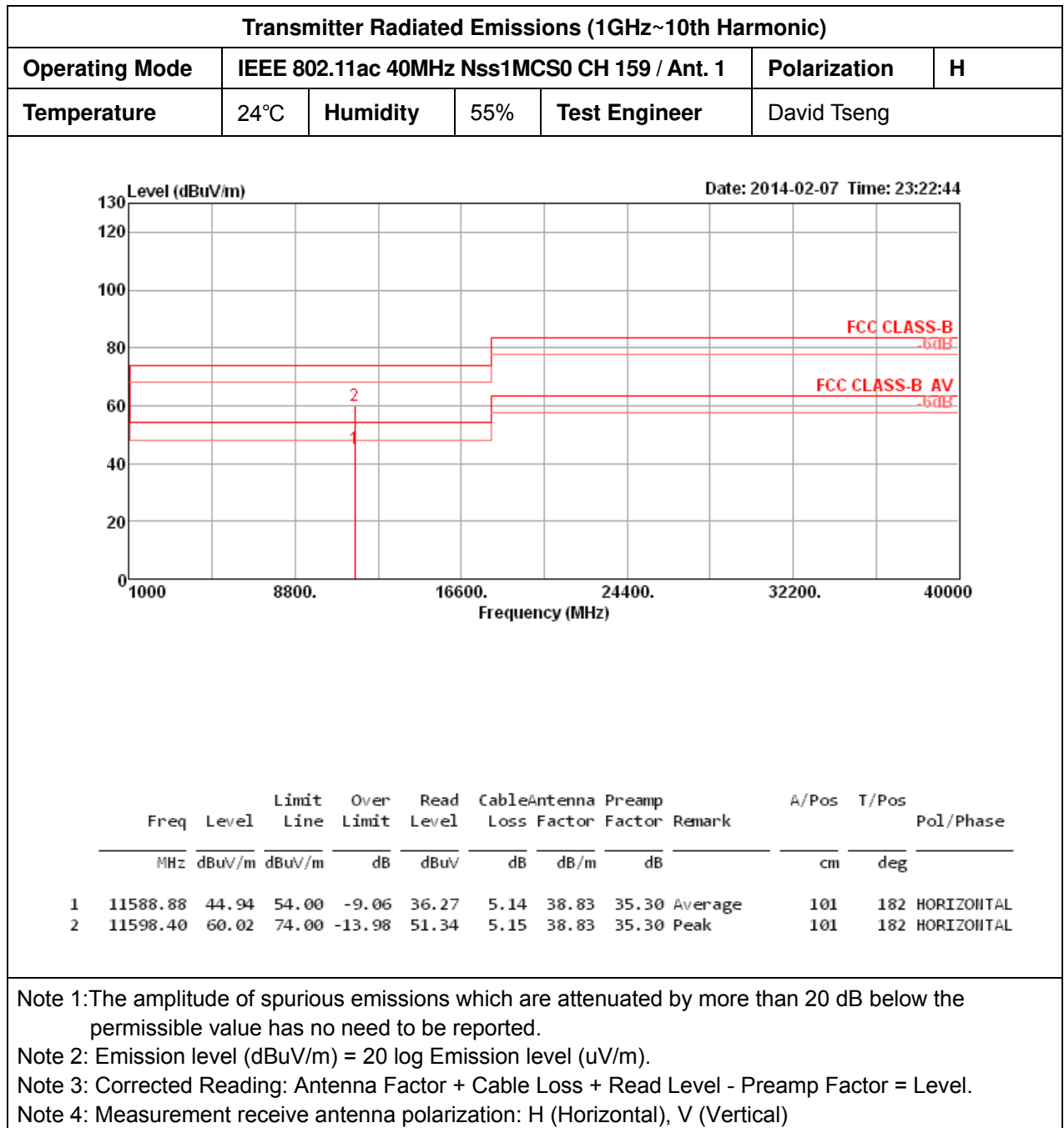


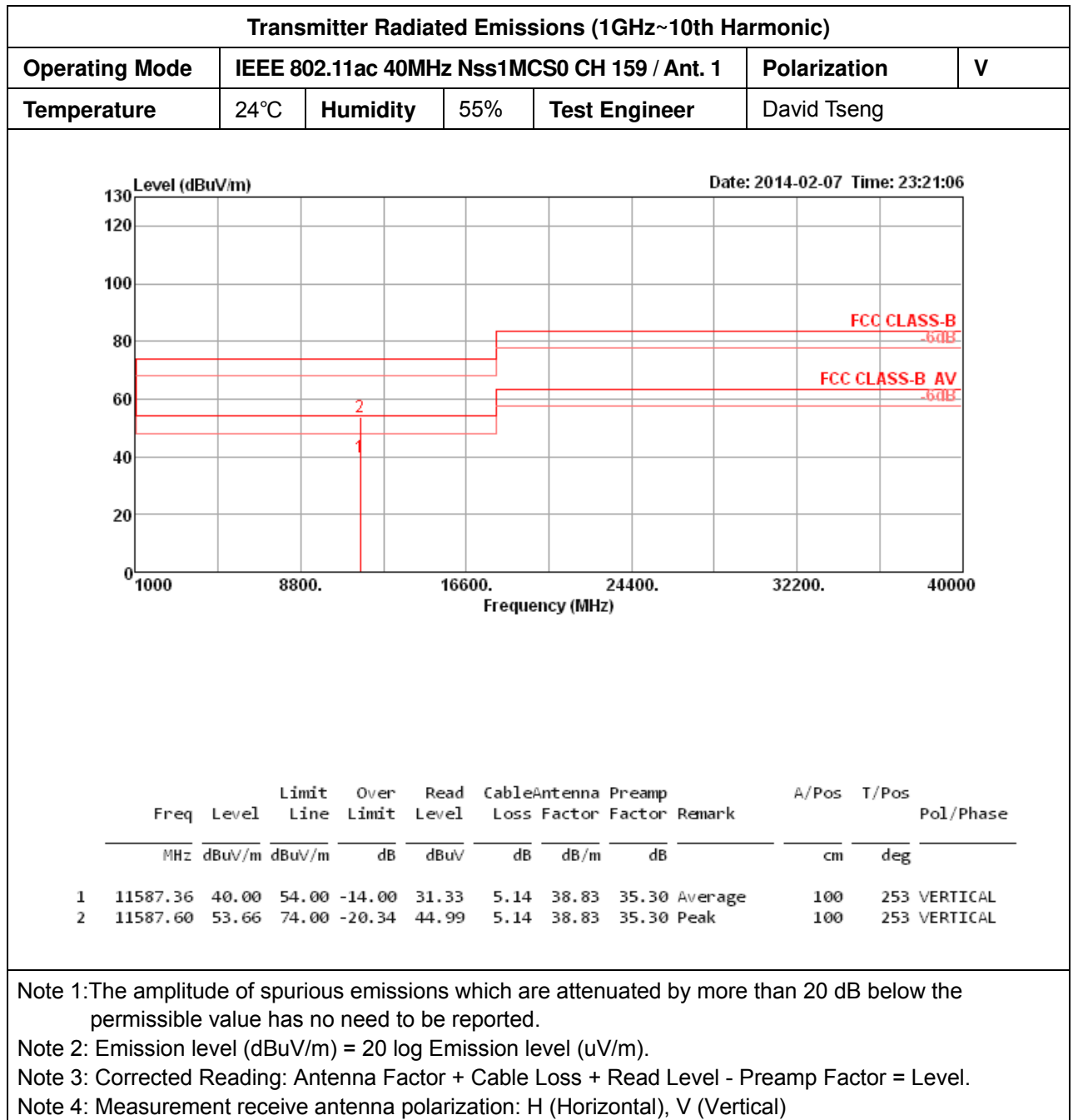


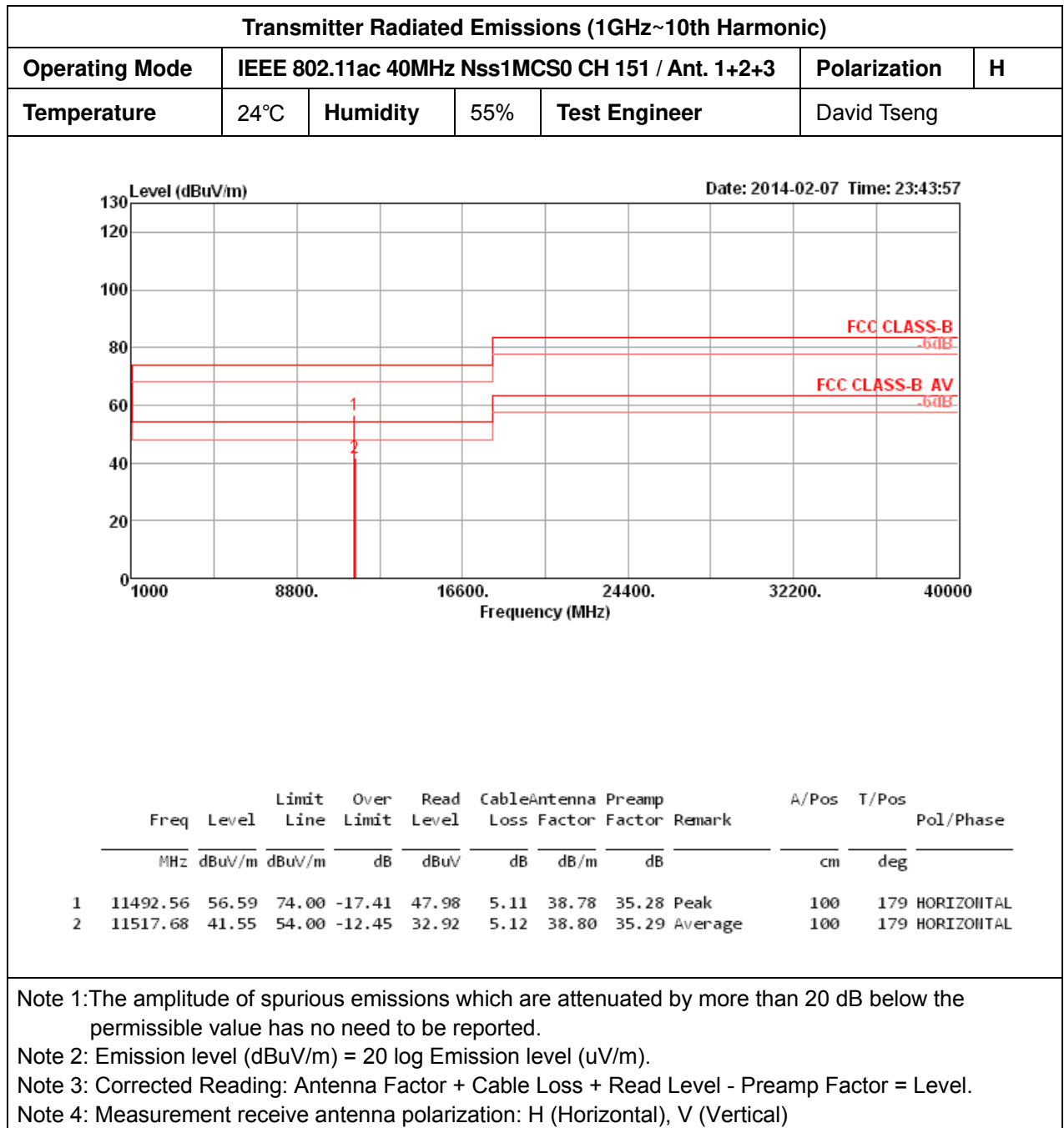


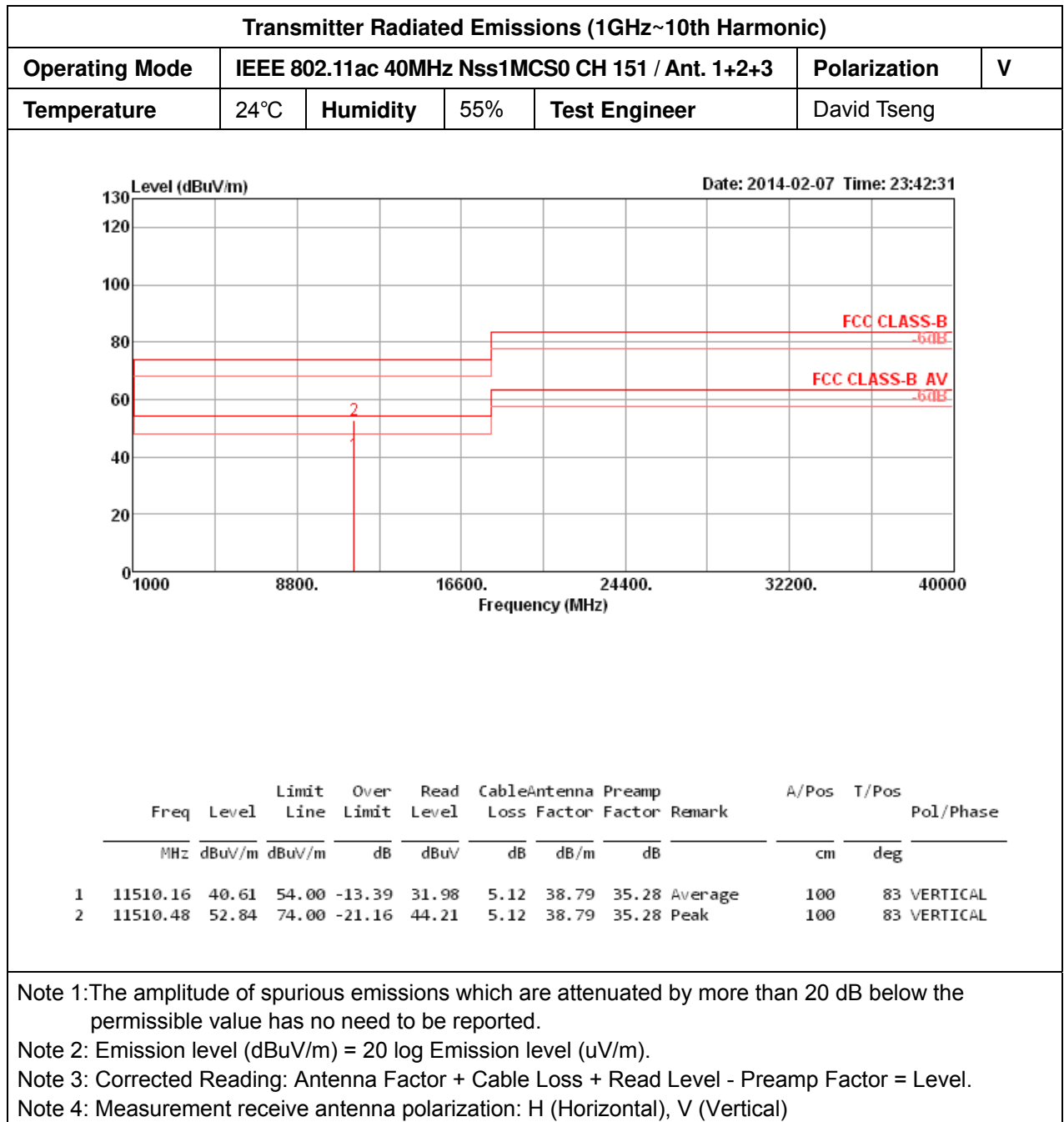


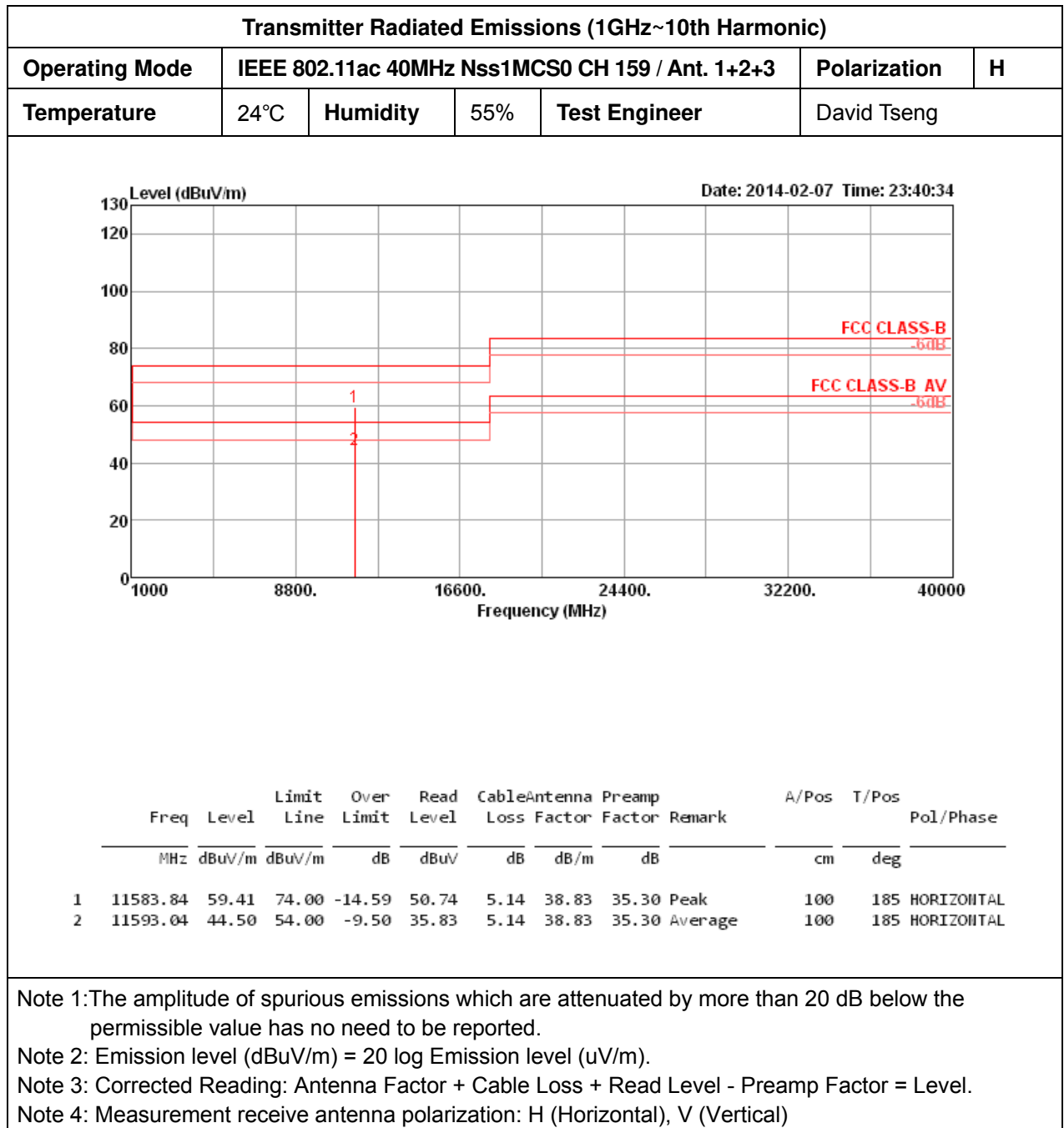


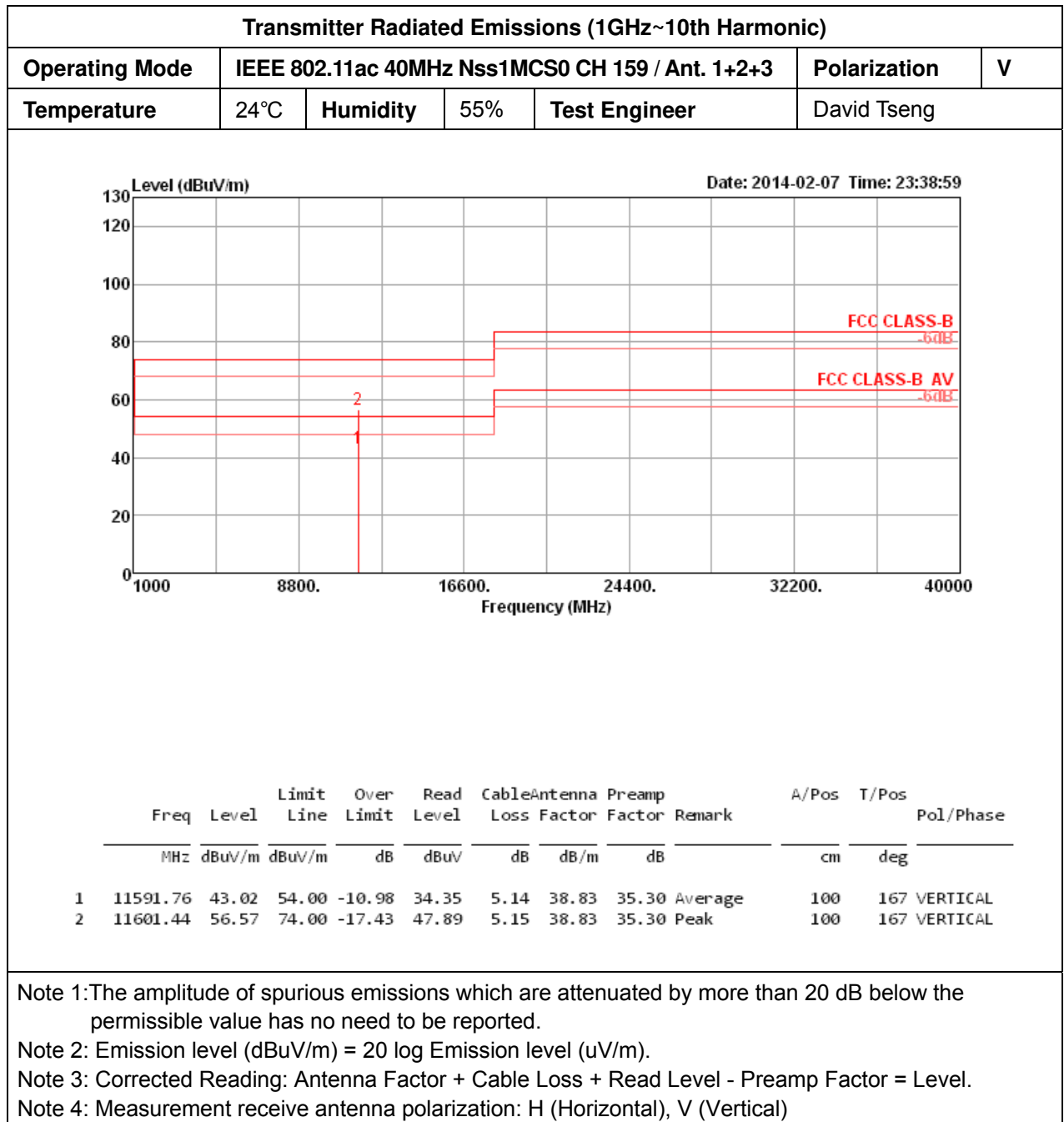


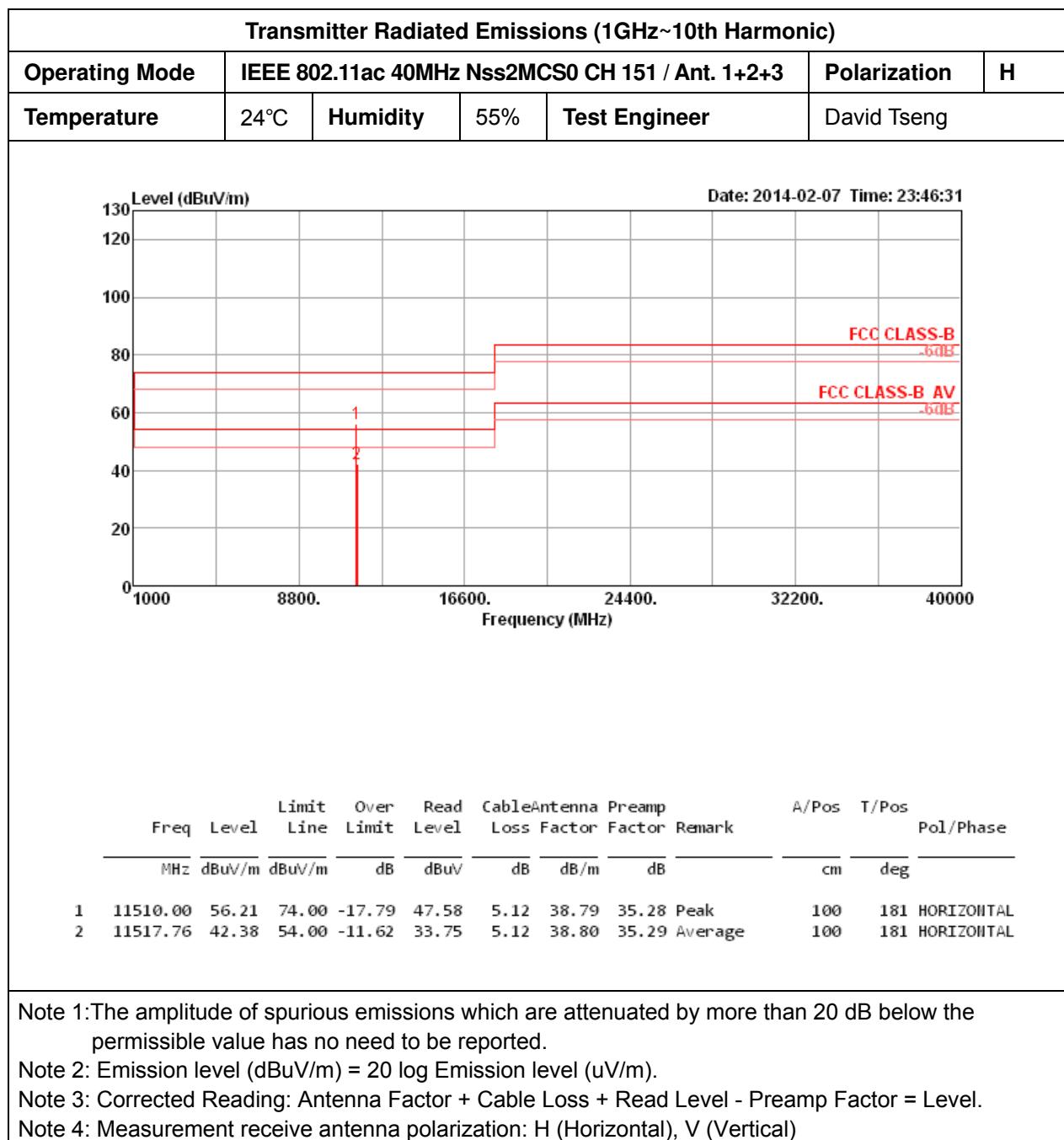


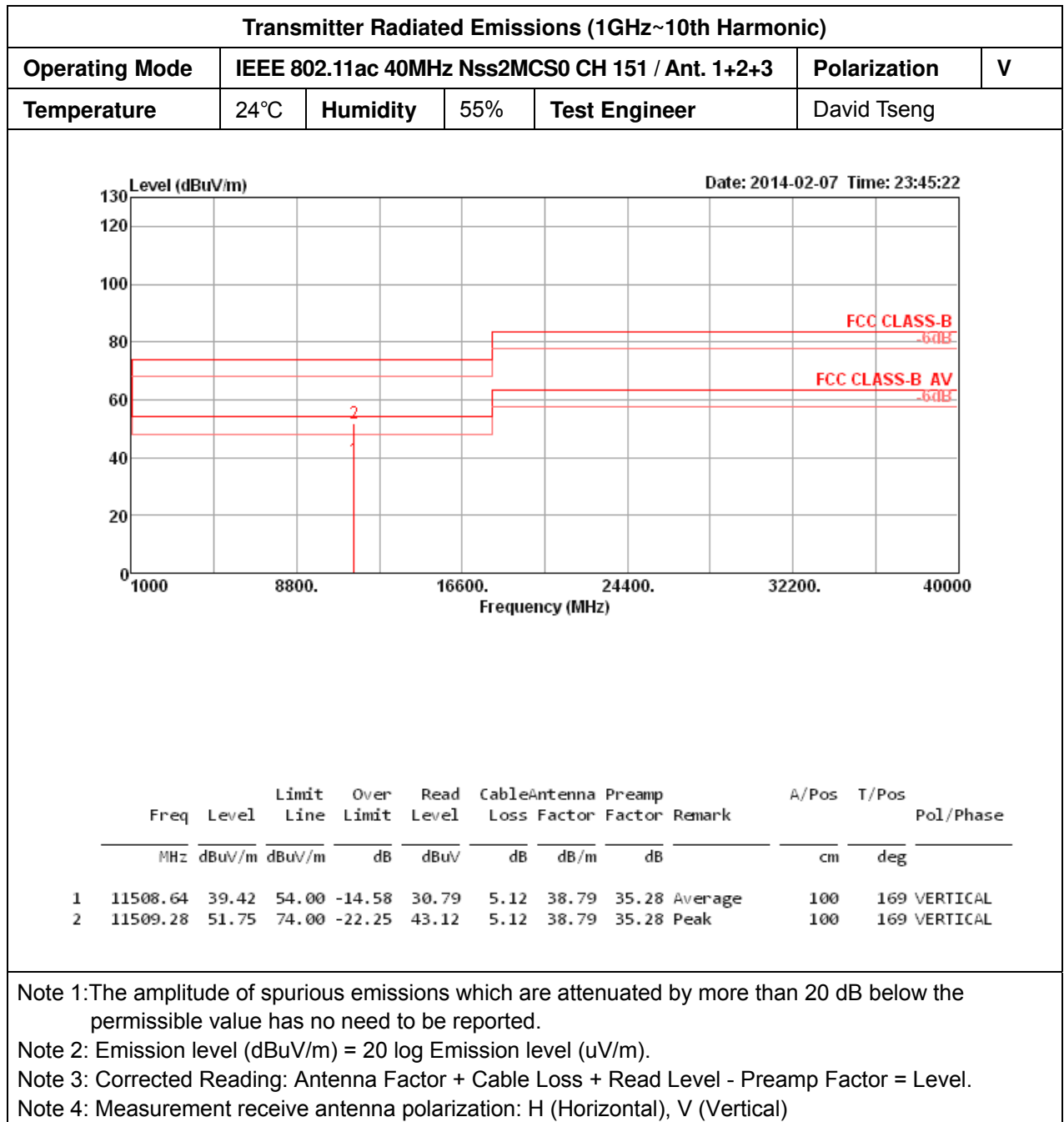


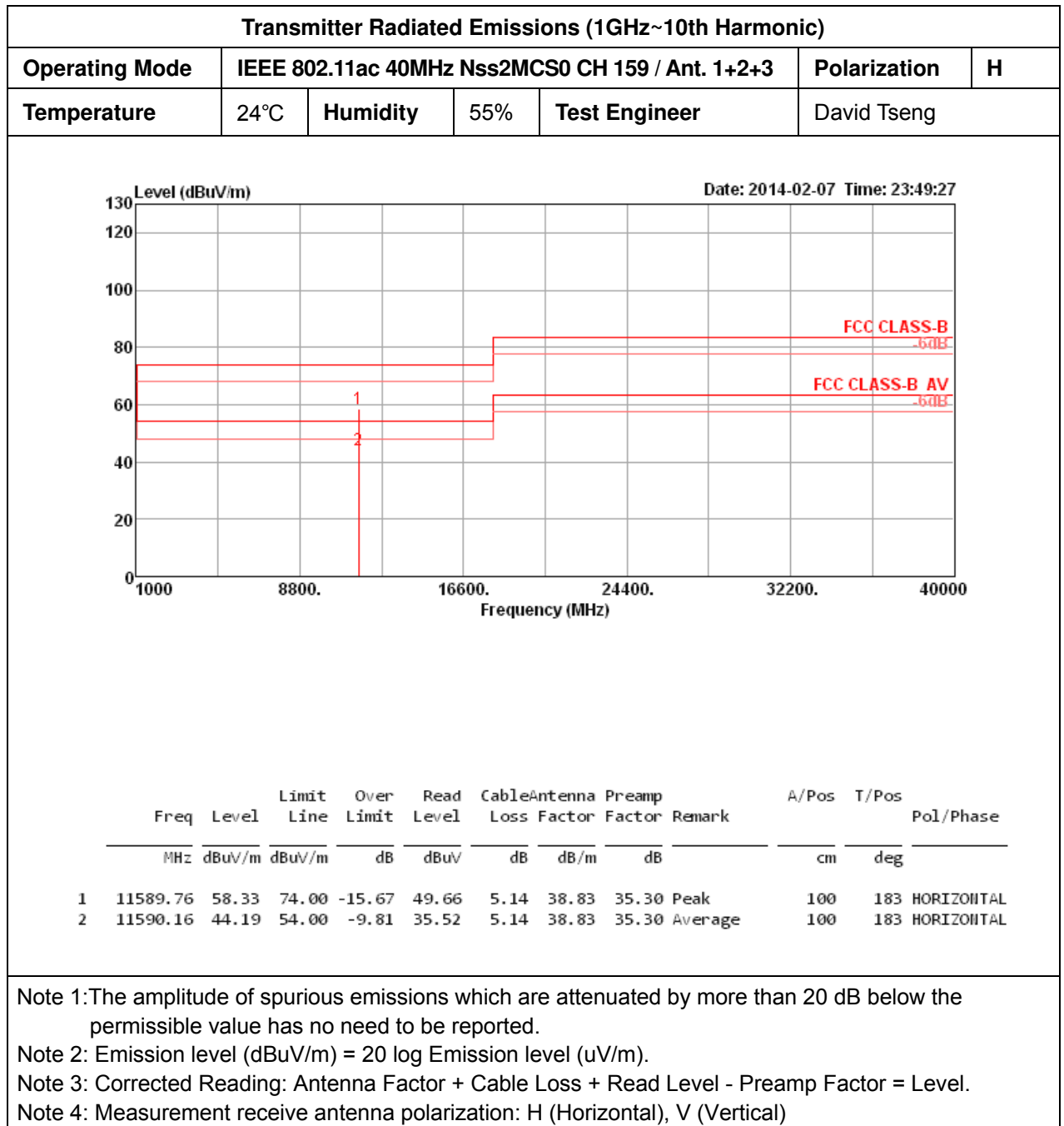


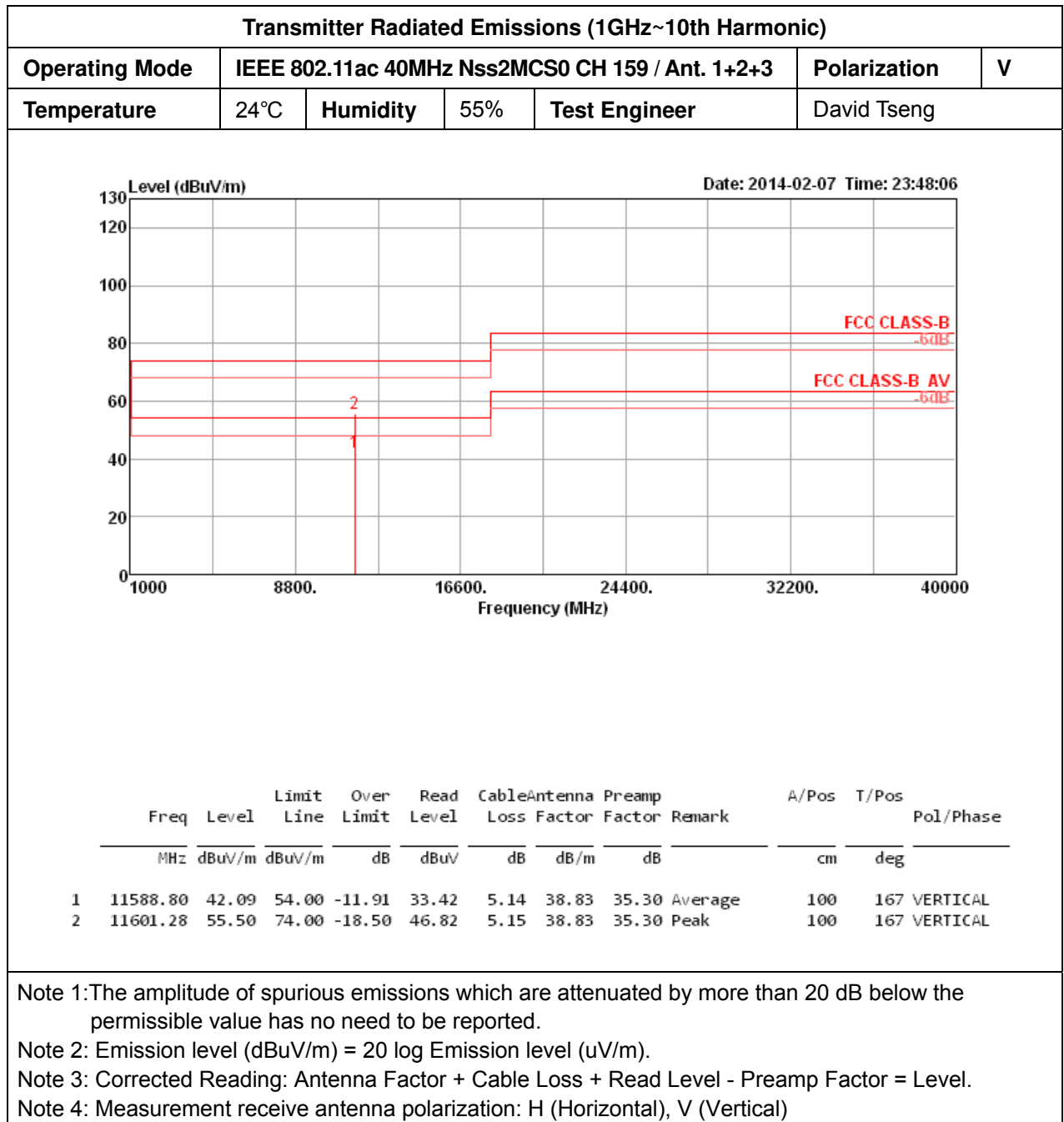


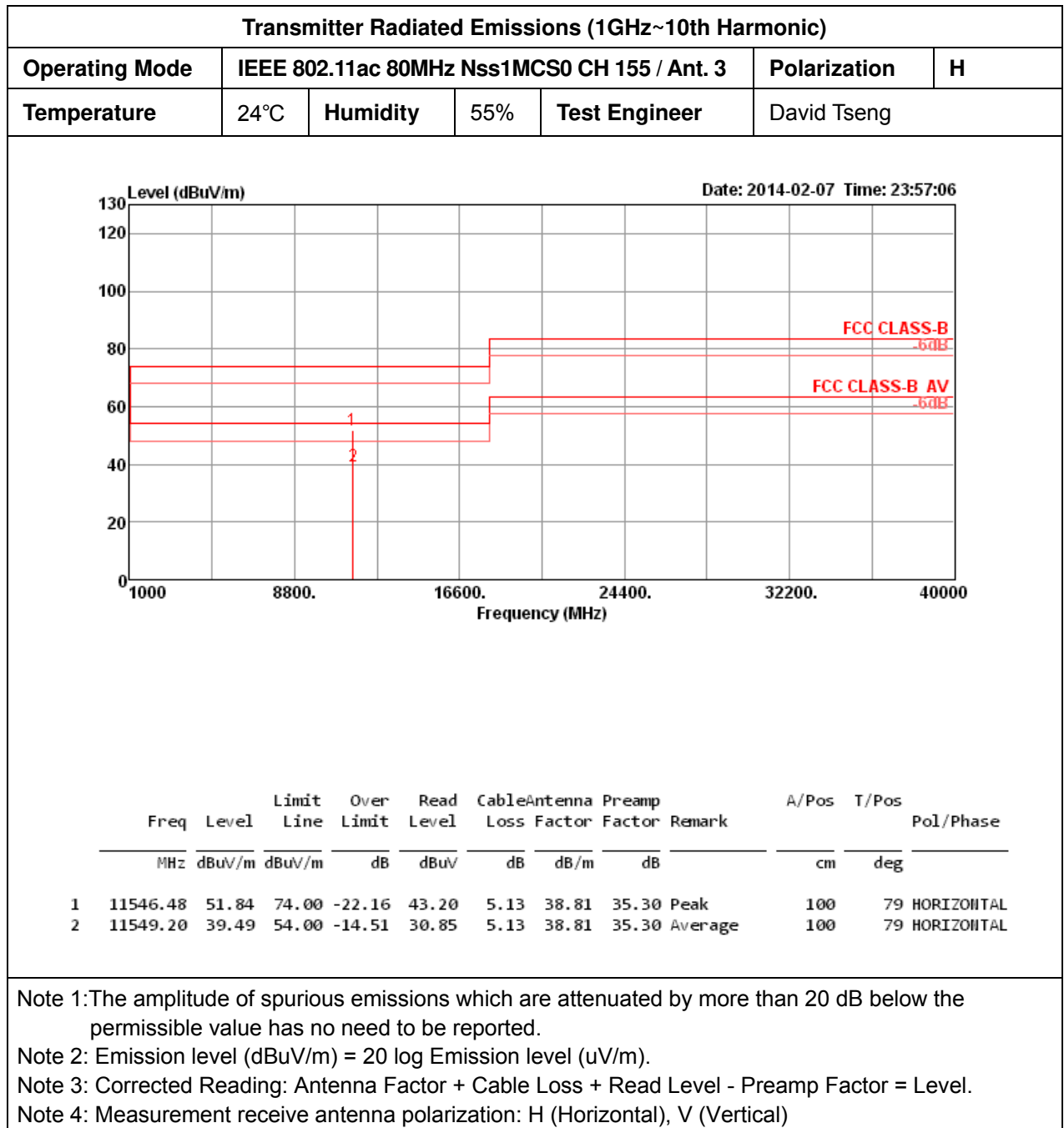


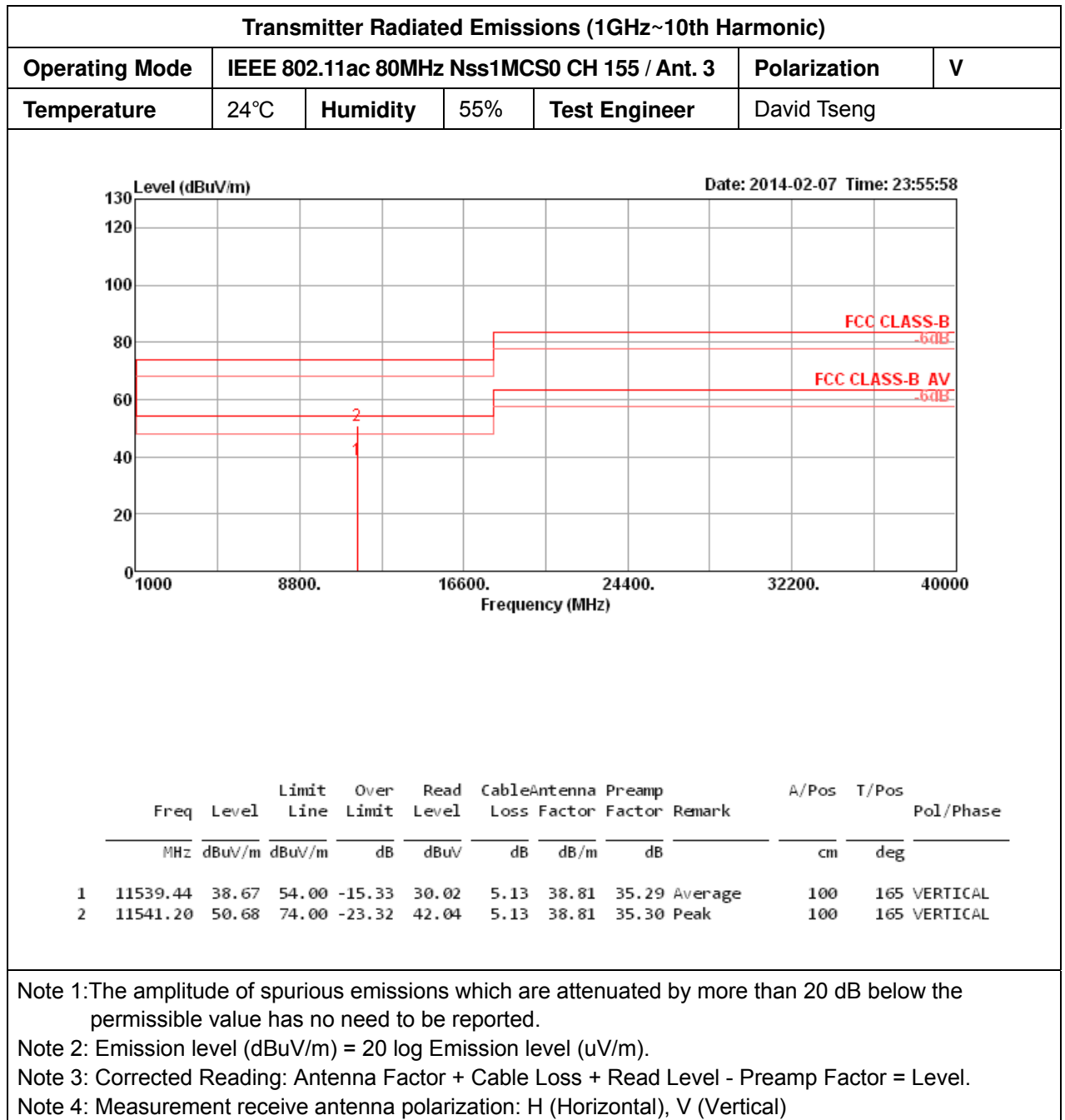


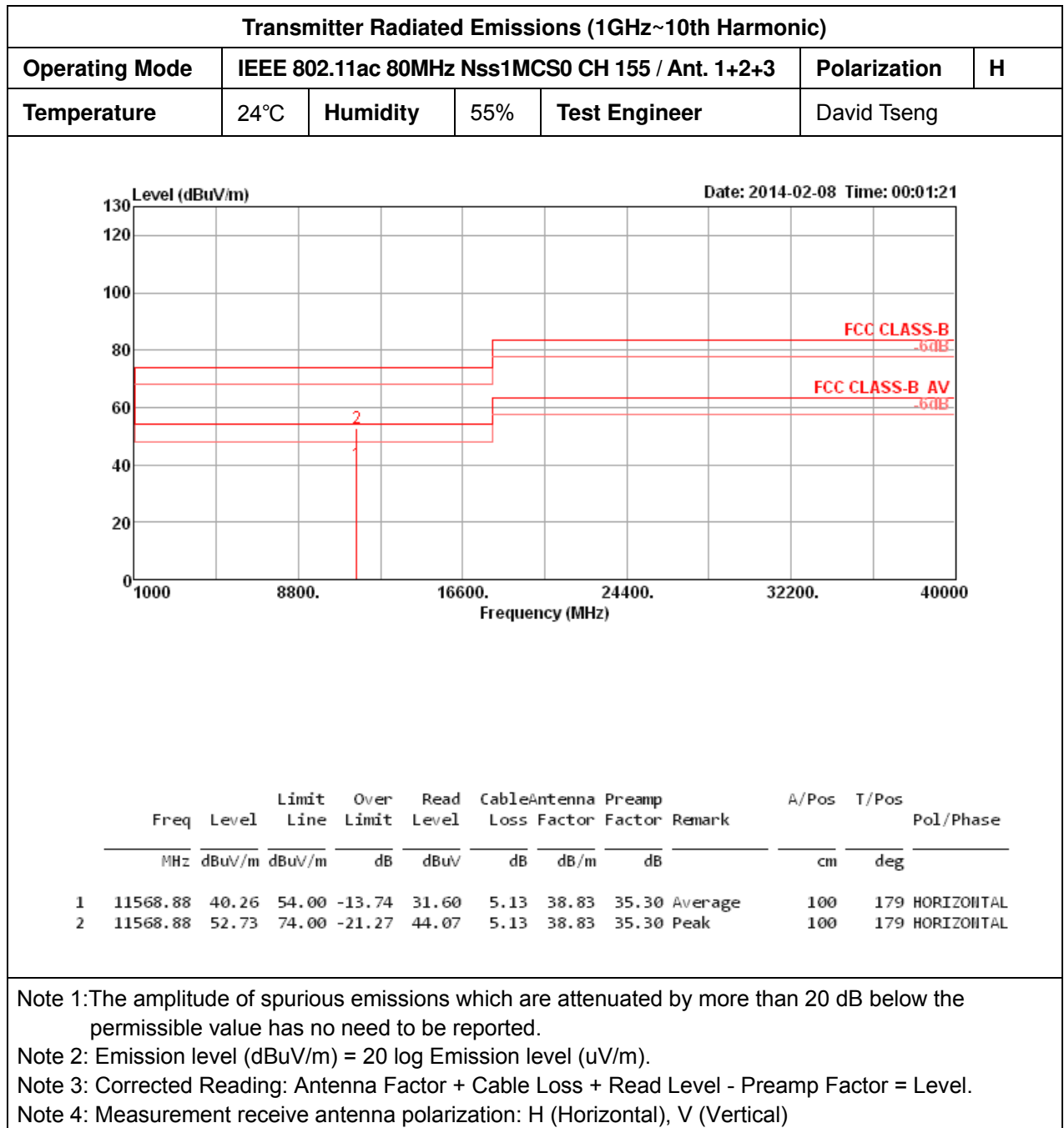


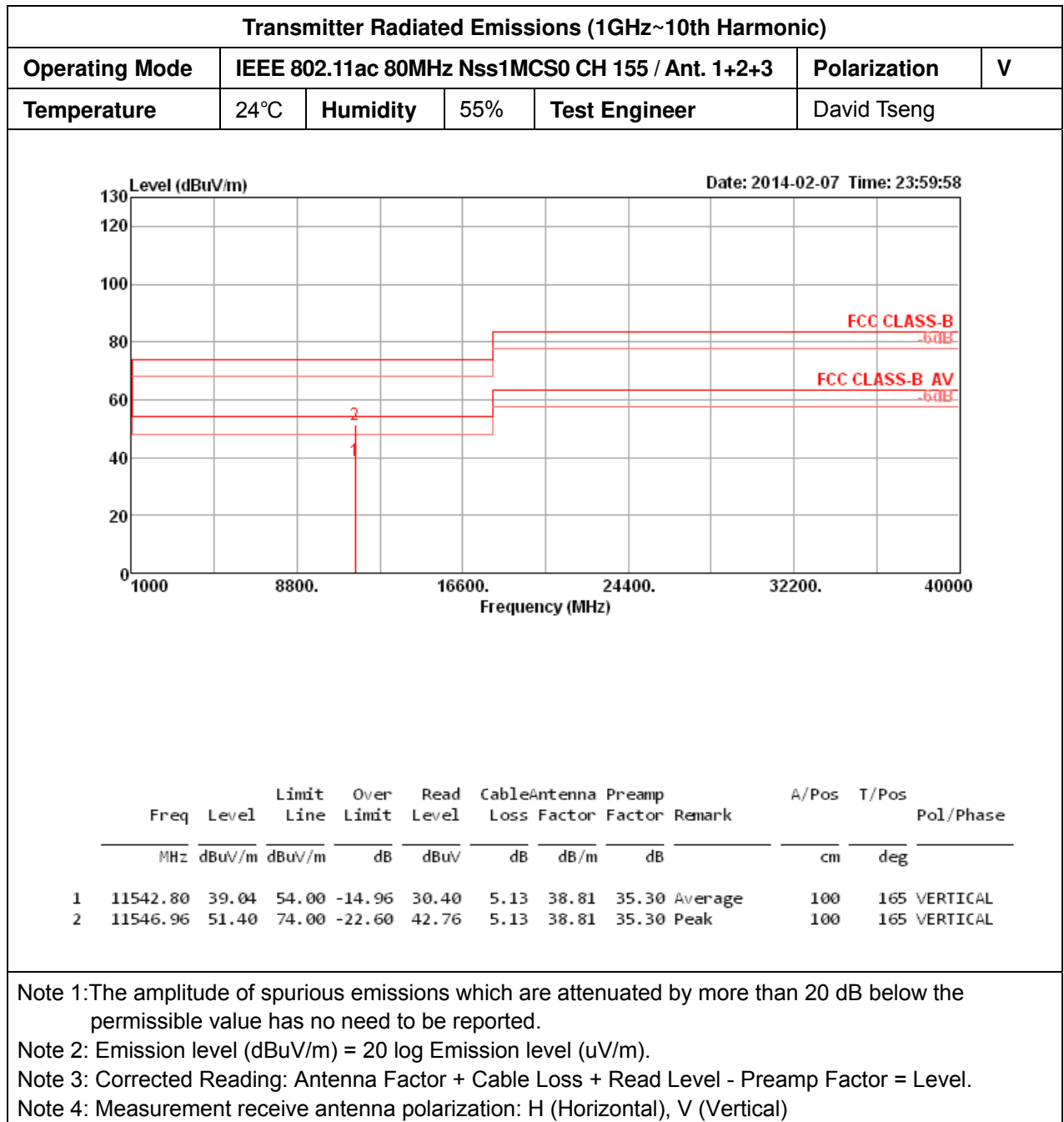


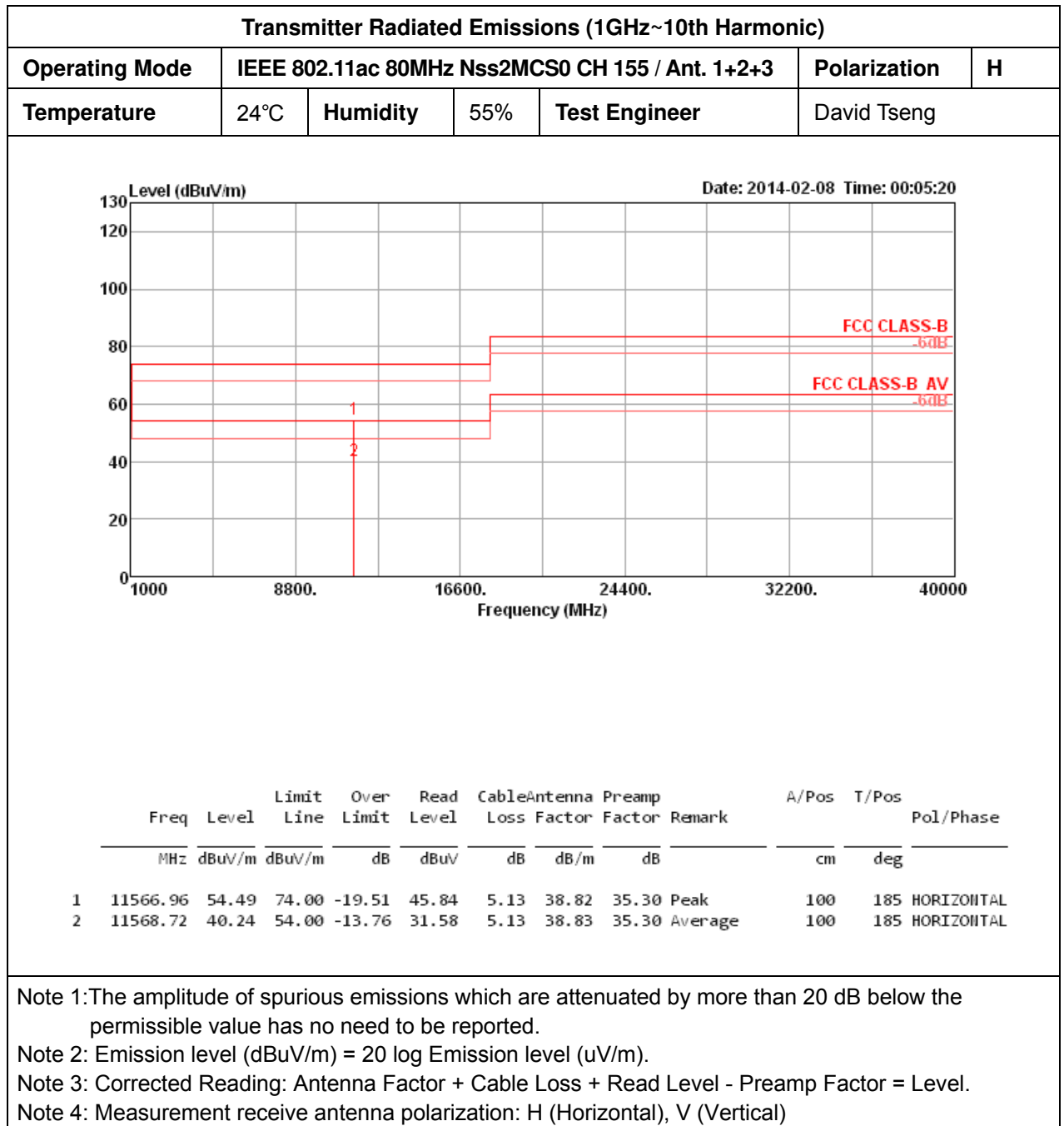


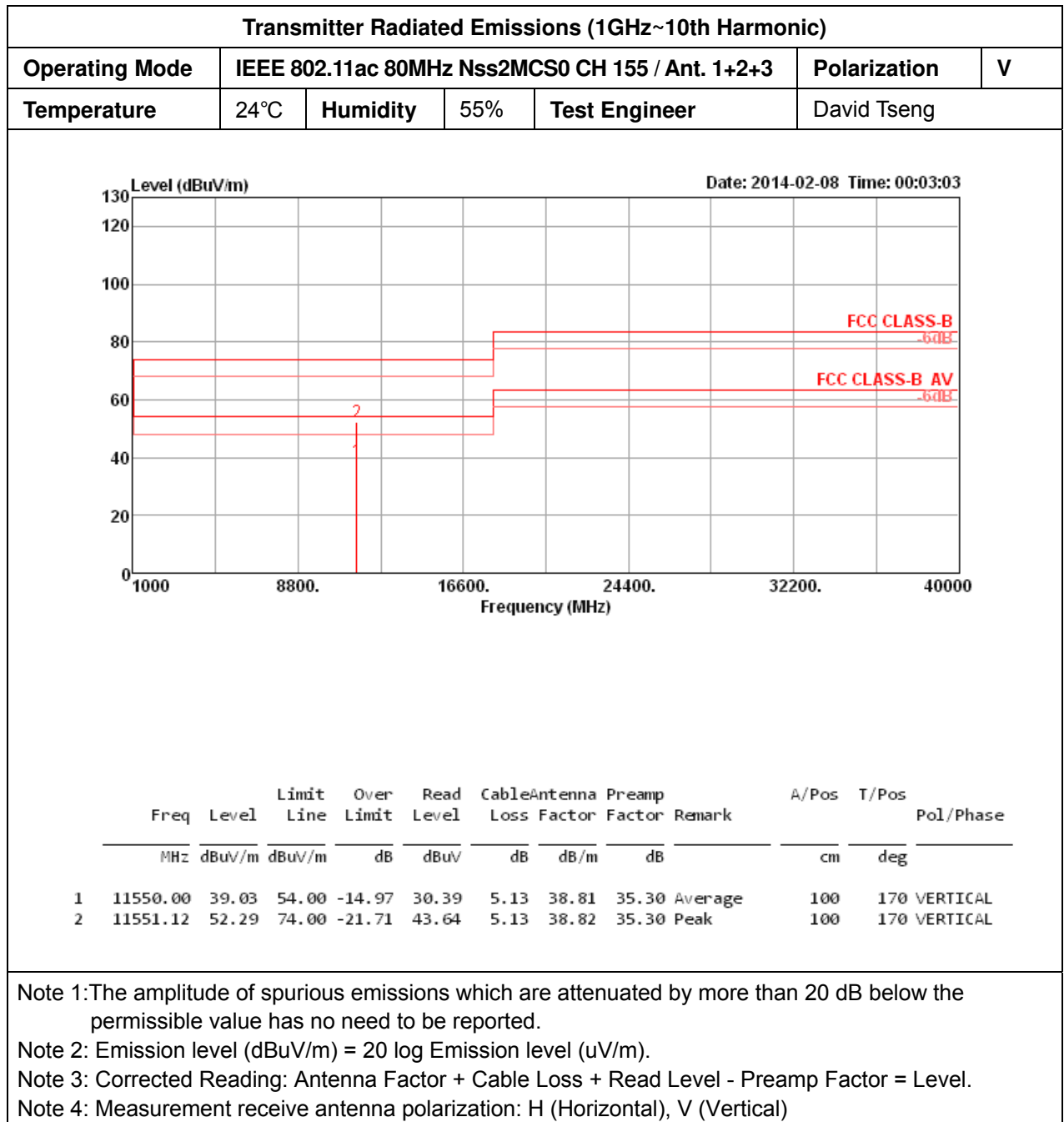






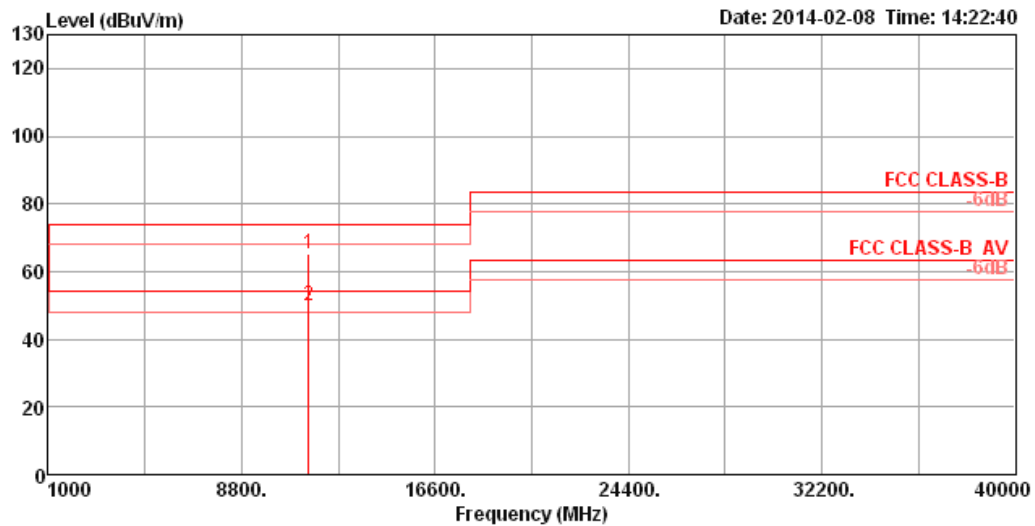






For Beamforming

Transmitter Radiated Emissions (1GHz~10th Harmonic)					
Operating Mode	IEEE 802.11ac 20MHz Nss1MCS0 CH 149 / Ant. 1+2+3			Polarization	H
Temperature	24°C	Humidity	55%	Test Engineer	David Tseng



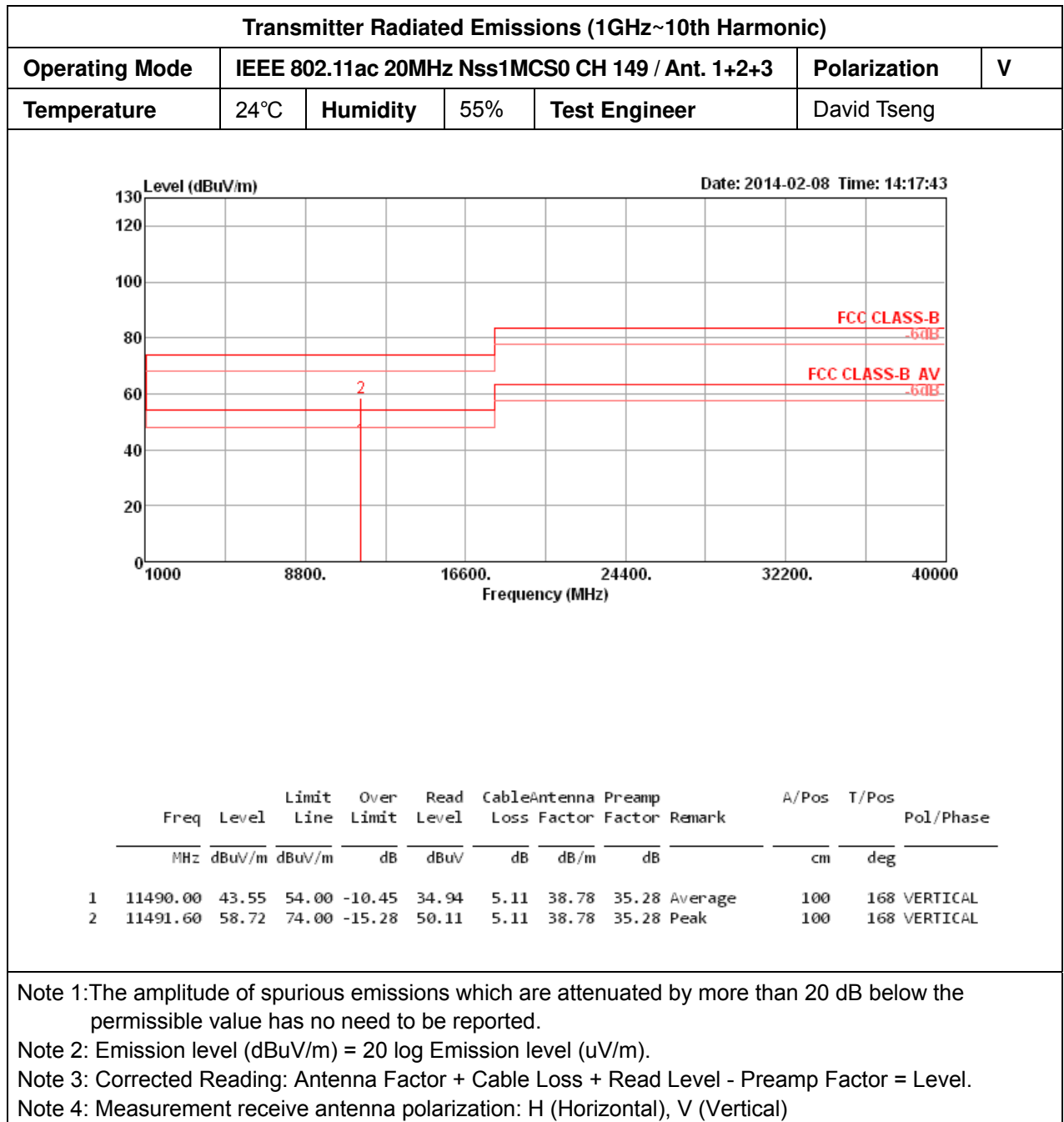
	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	Remark	cm	deg	
1	11489.36	65.46	74.00	-8.54	56.85	5.11	38.78	35.28	Peak	100	180	HORIZONTAL
2	11490.00	49.79	54.00	-4.21	41.18	5.11	38.78	35.28	Average	100	180	HORIZONTAL

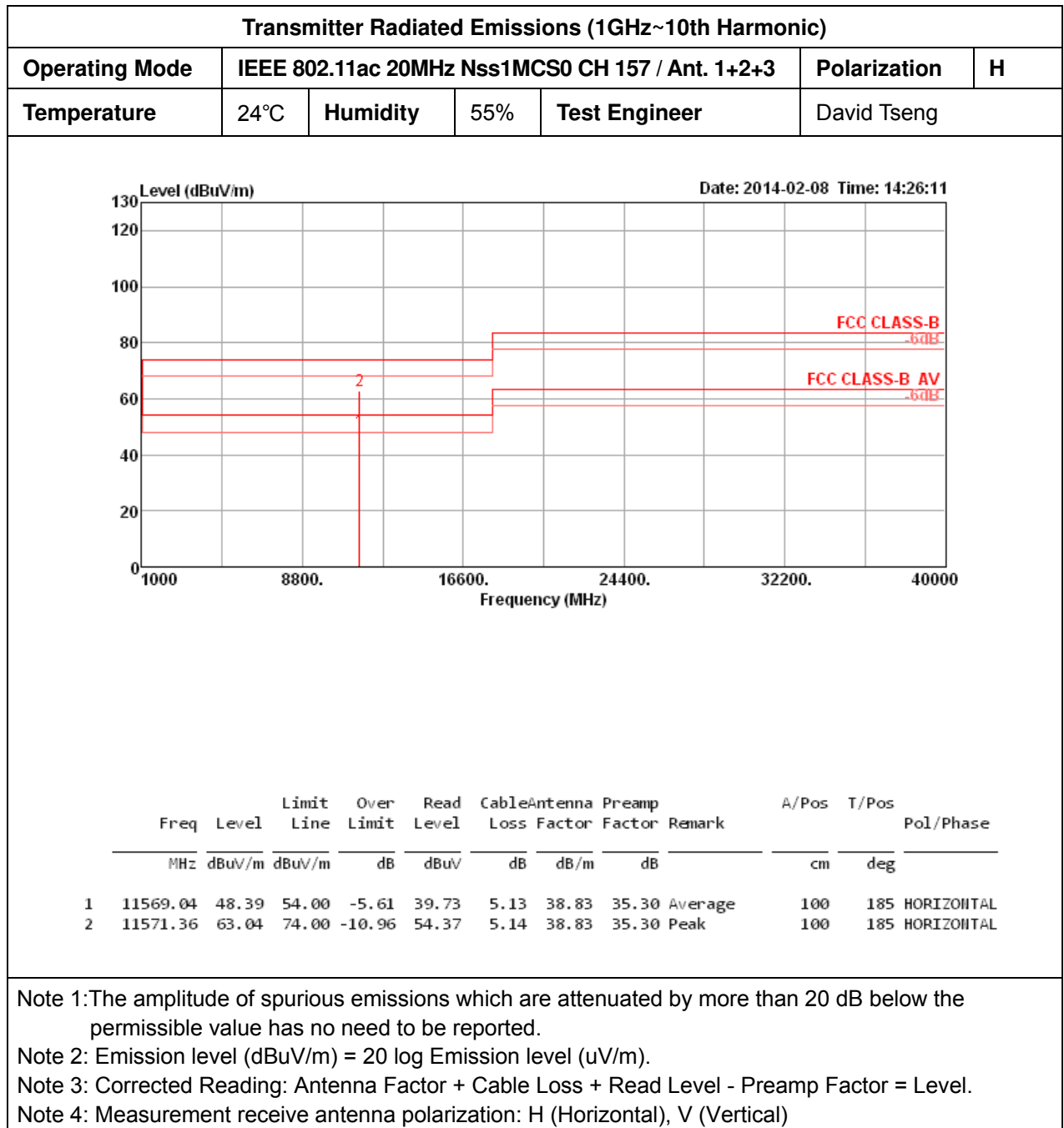
Note 1: The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

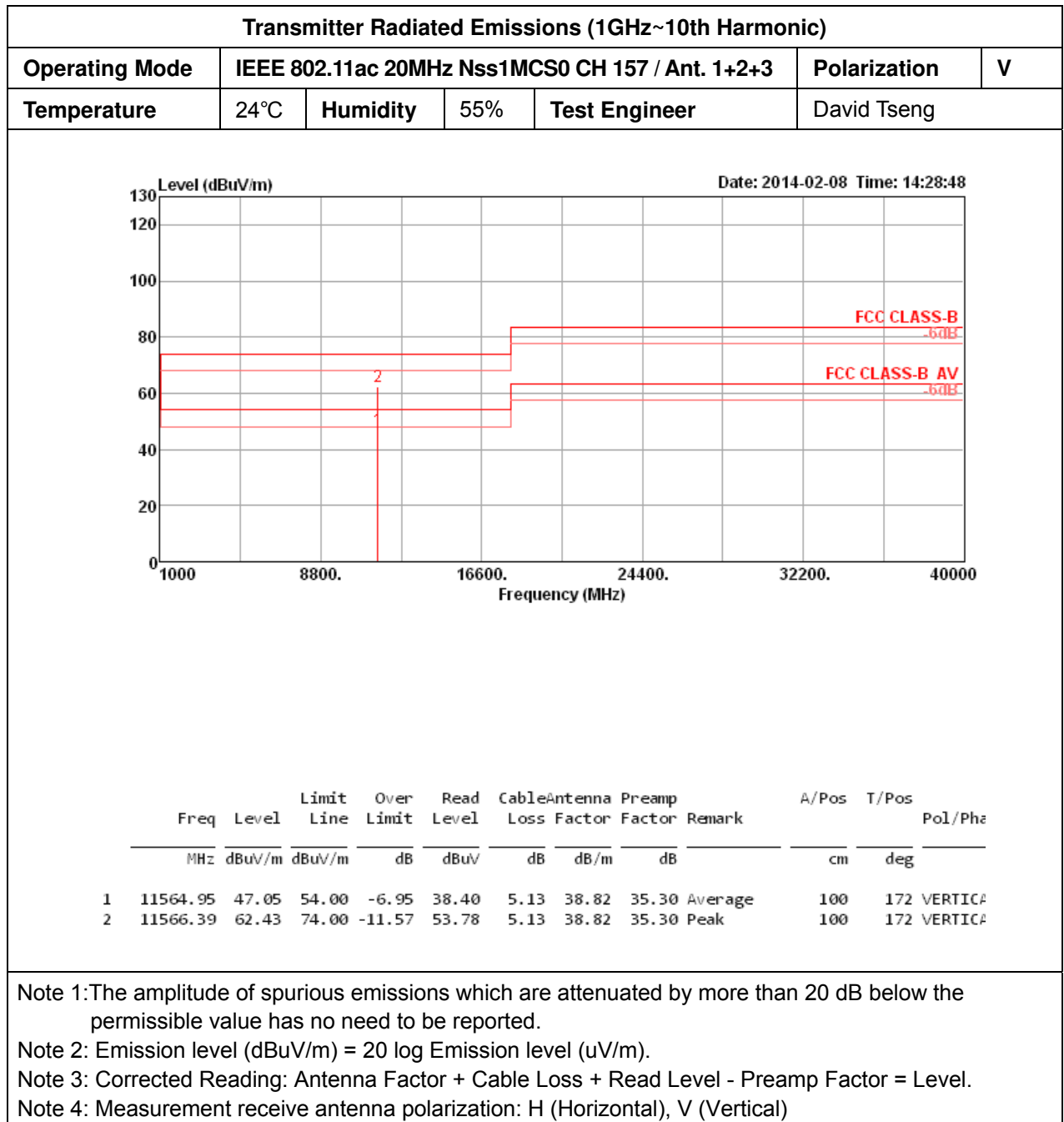
Note 2: Emission level (dBuV/m) = 20 log Emission level (uV/m).

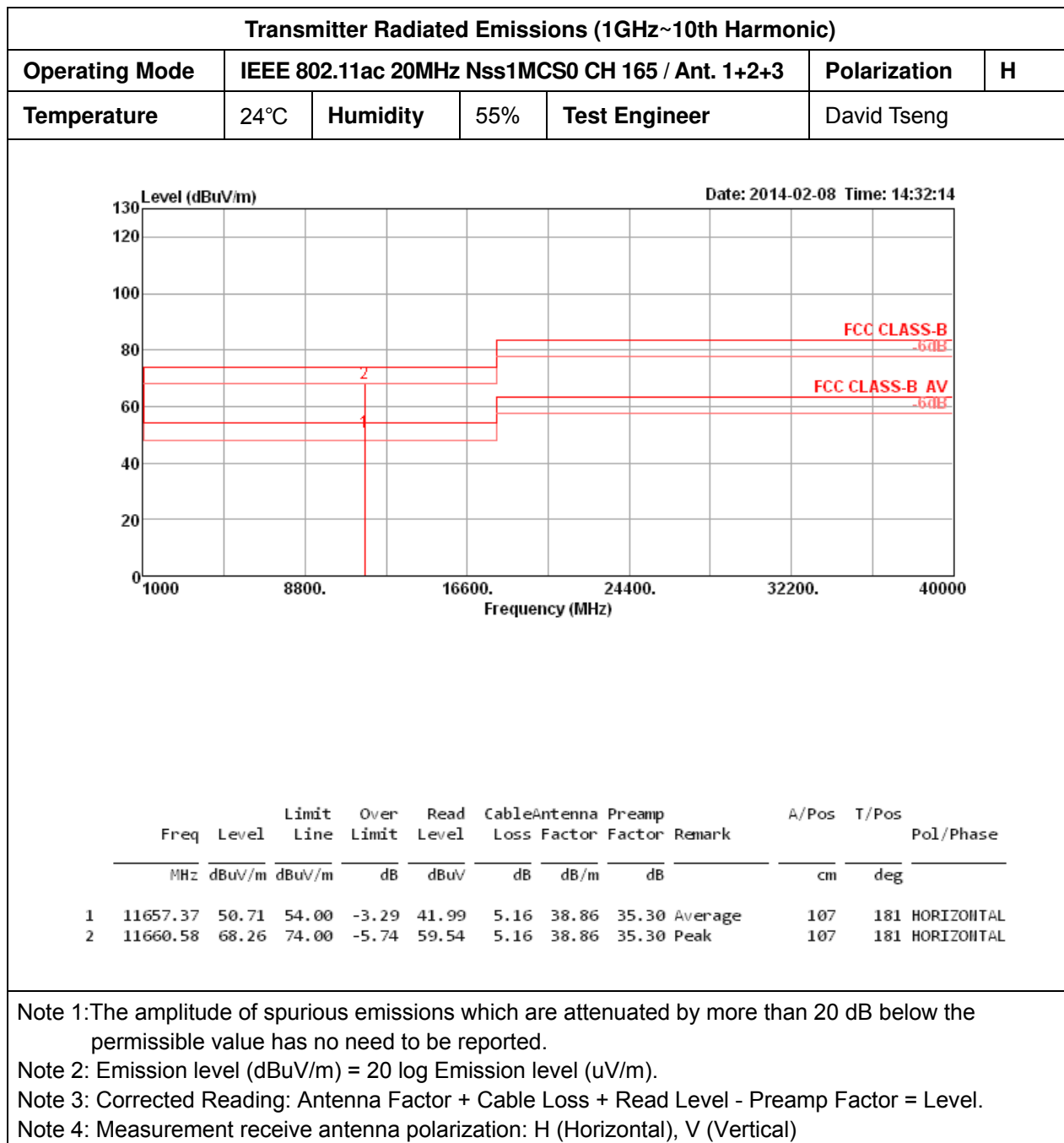
Note 3: Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

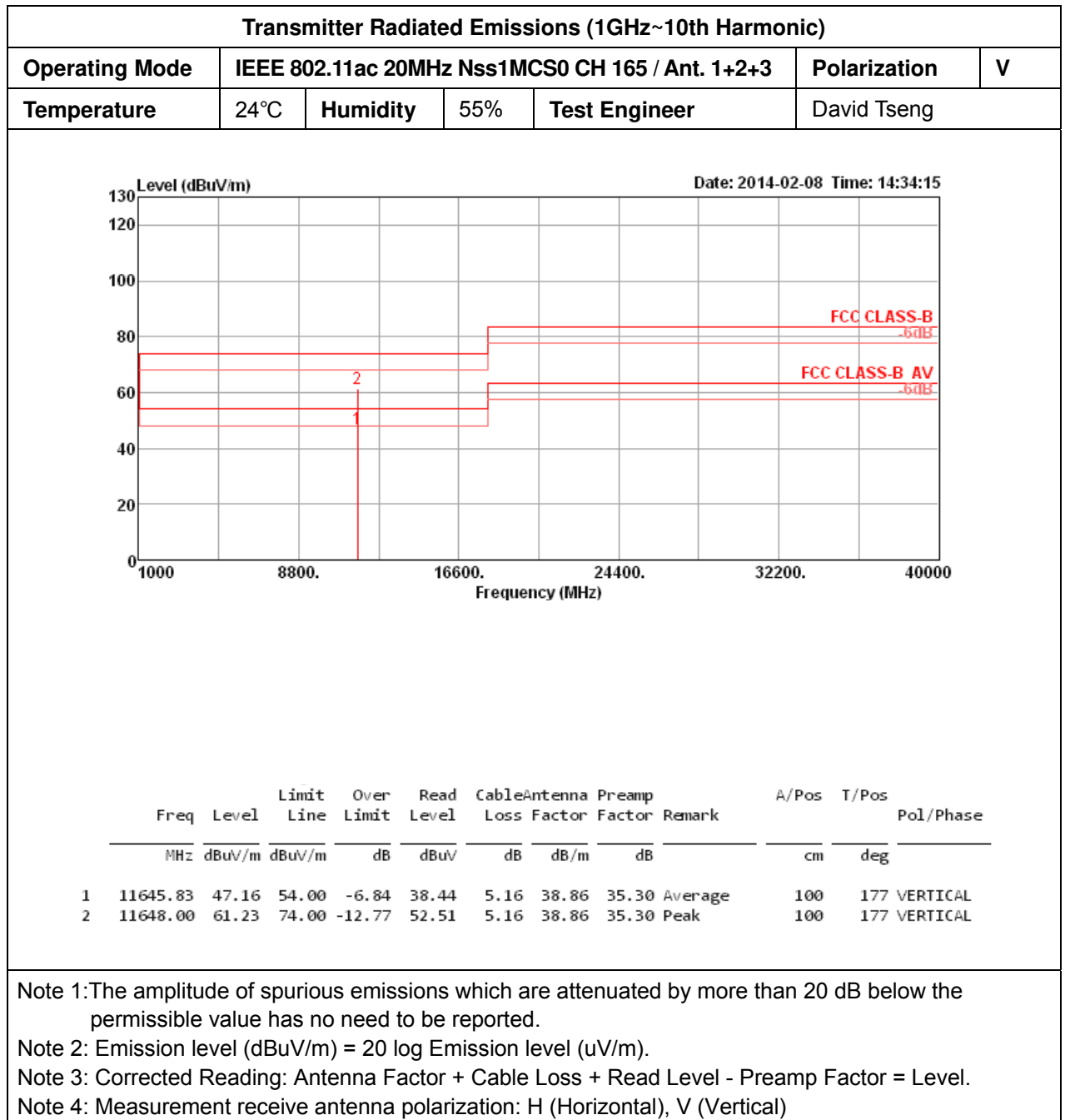
Note 4: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

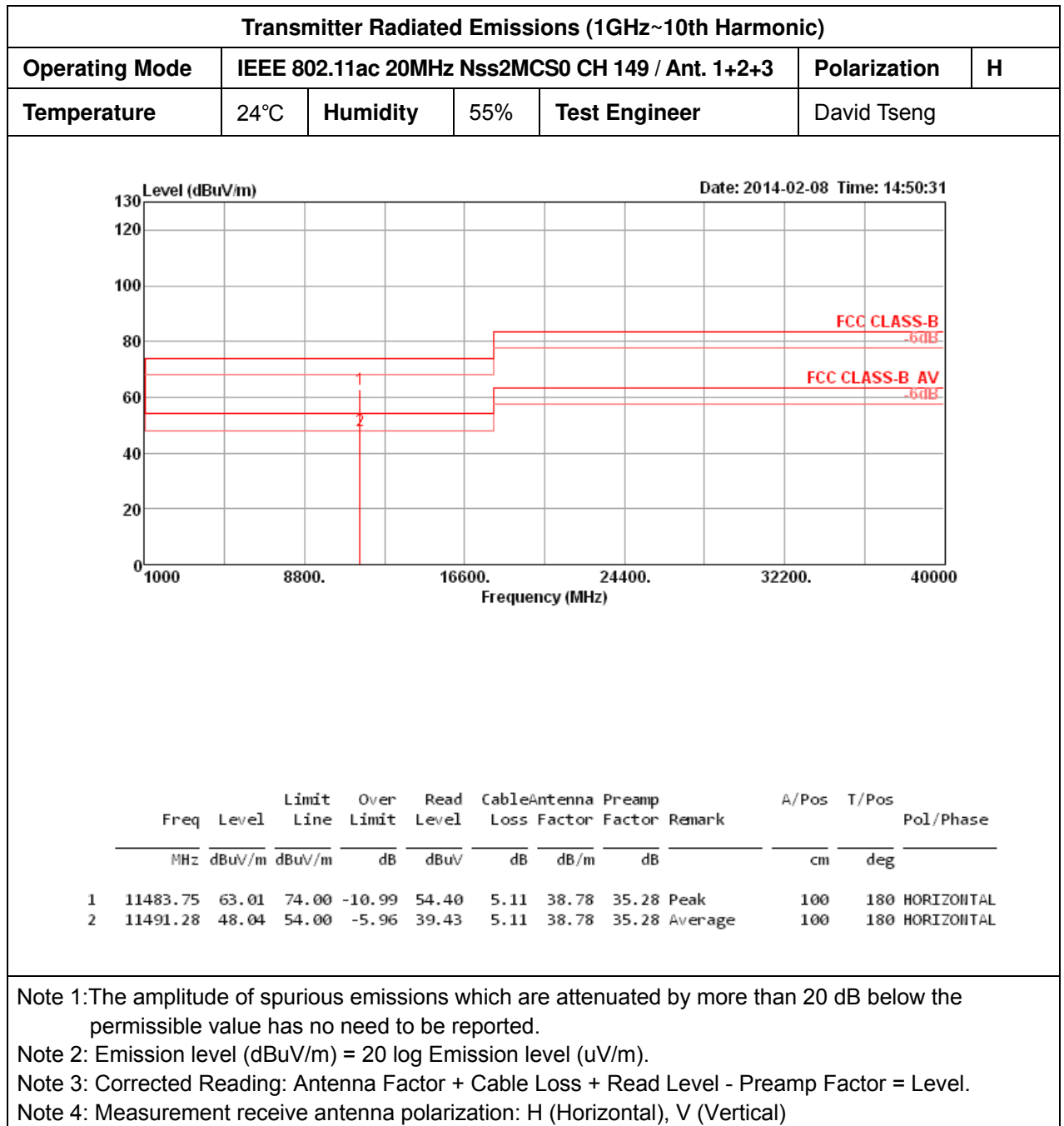


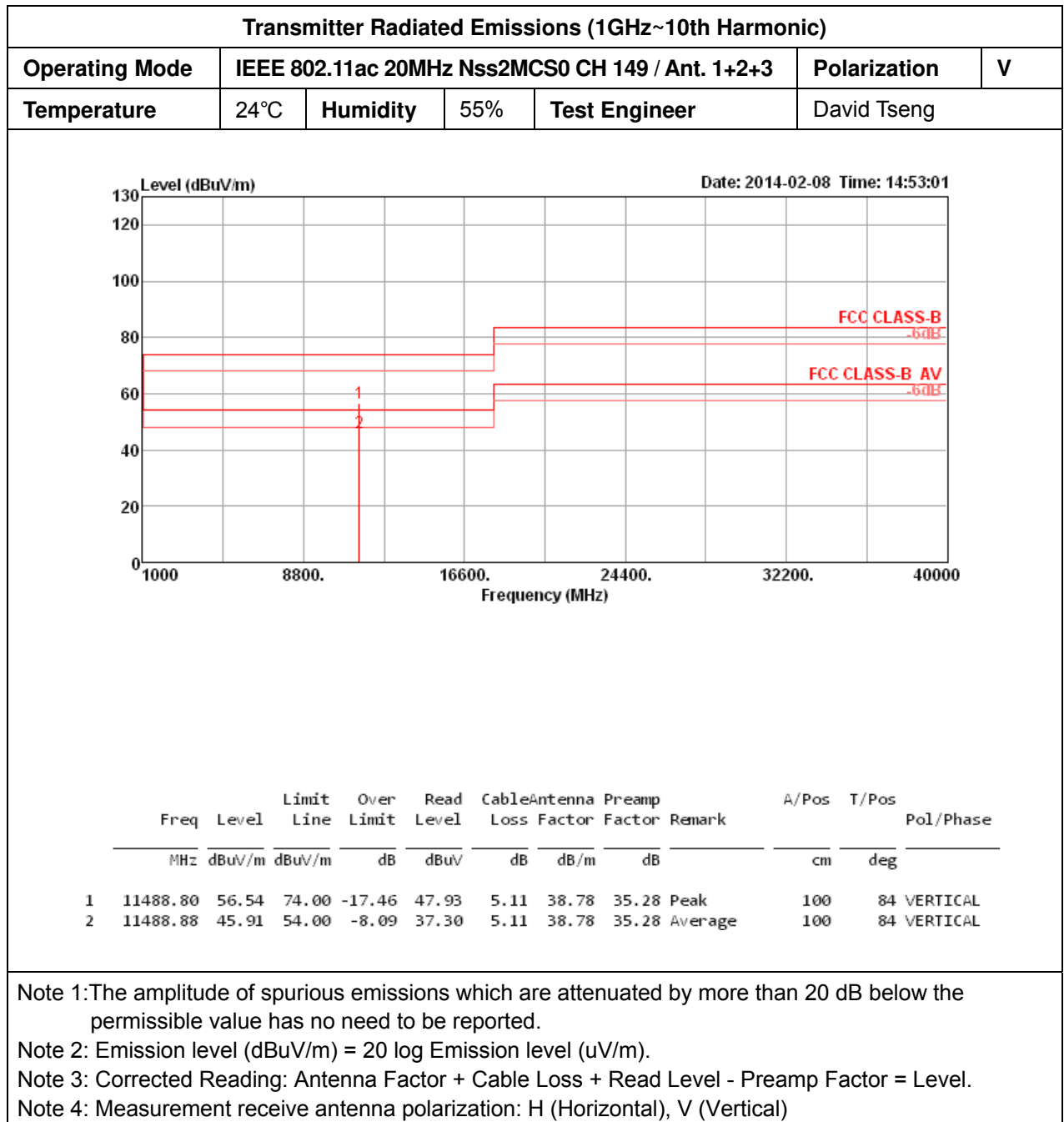


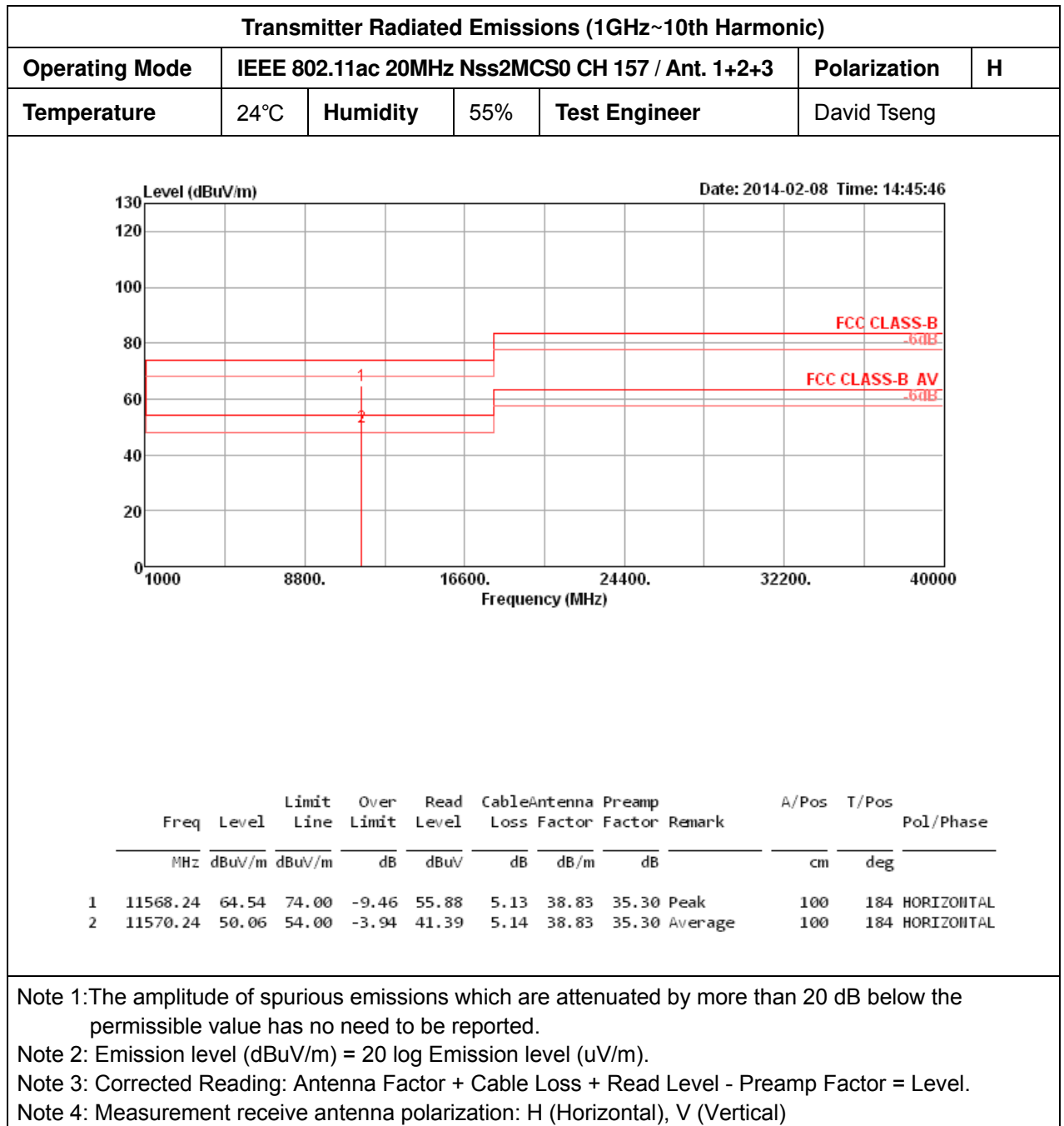


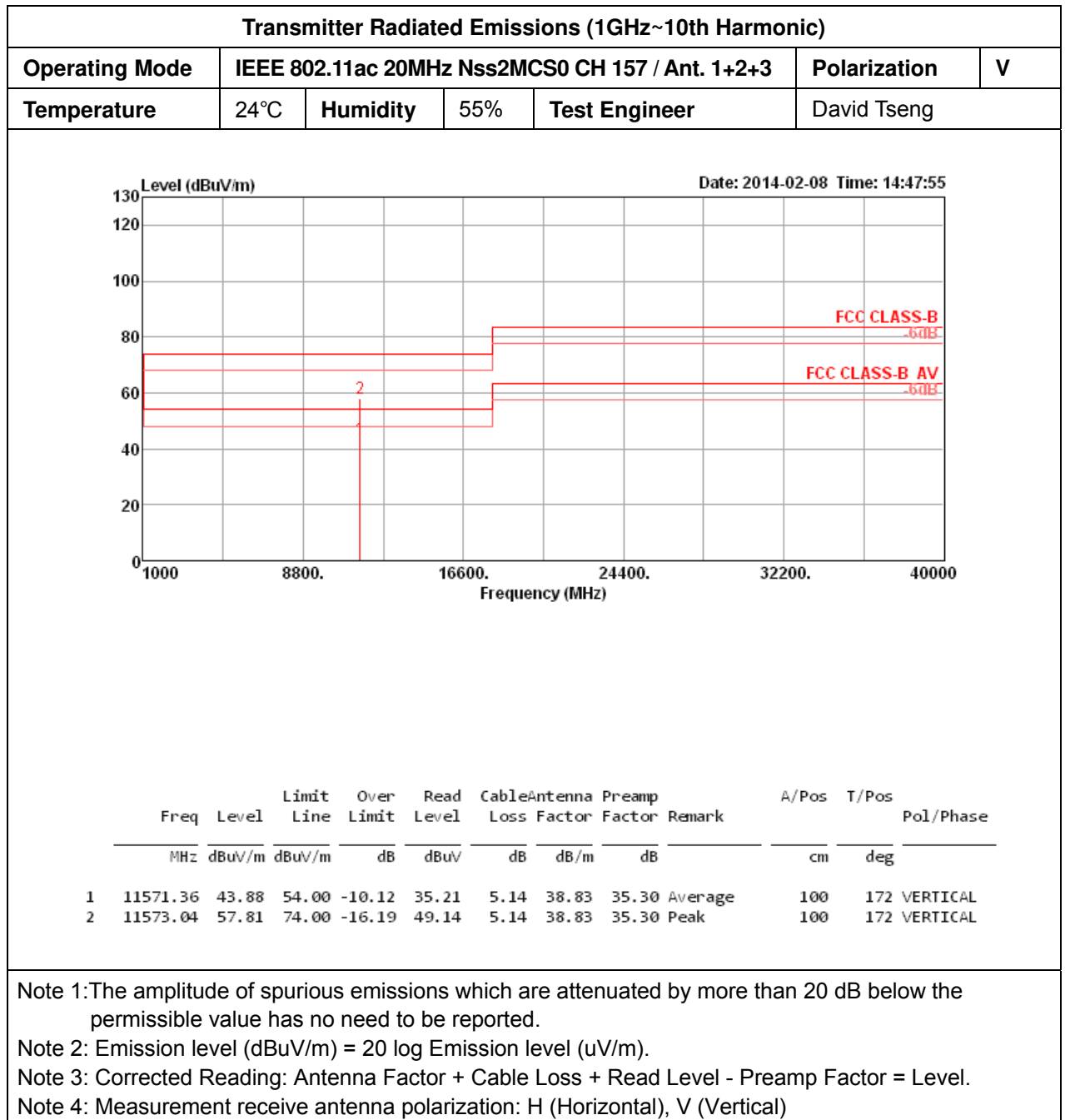


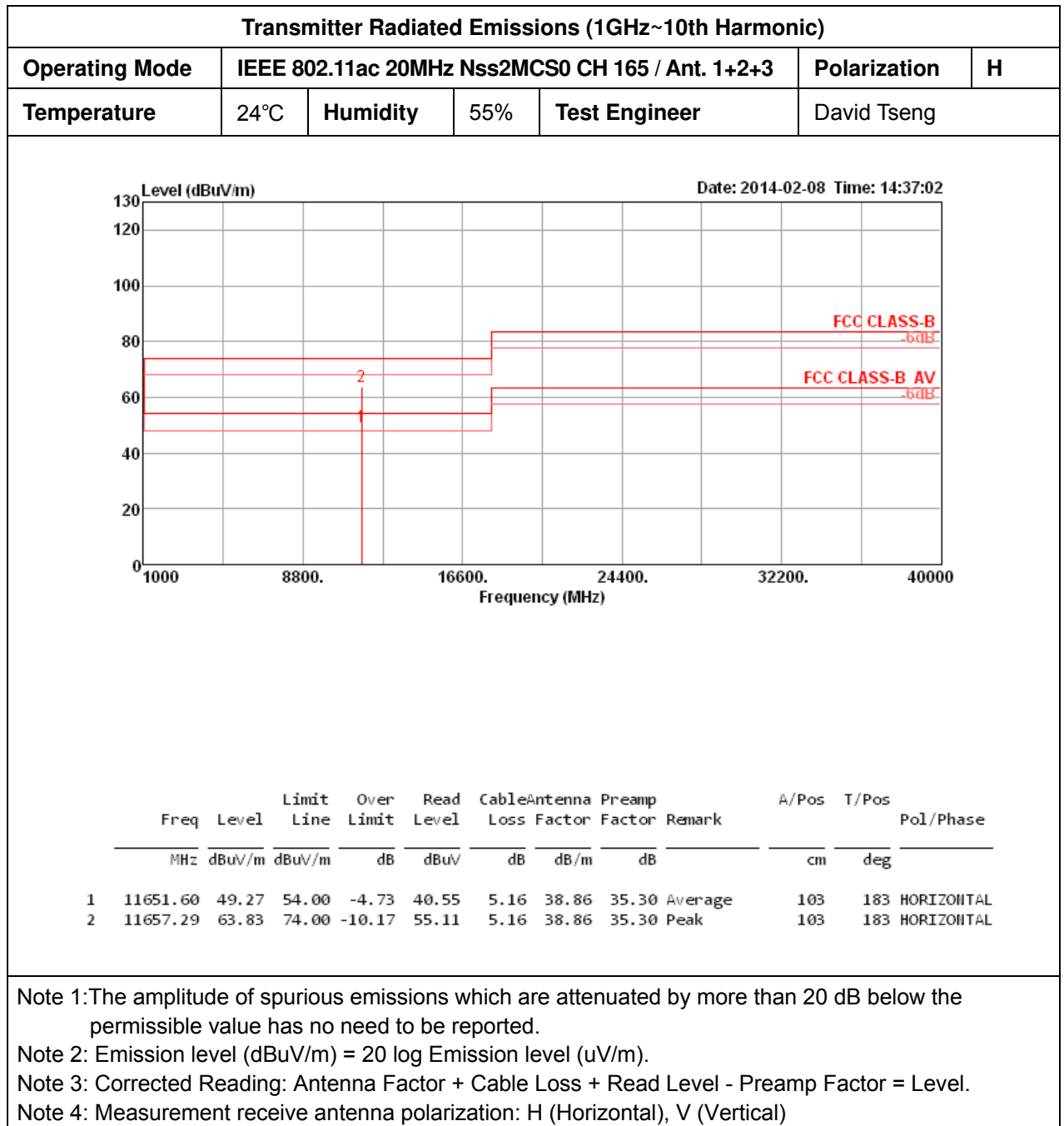


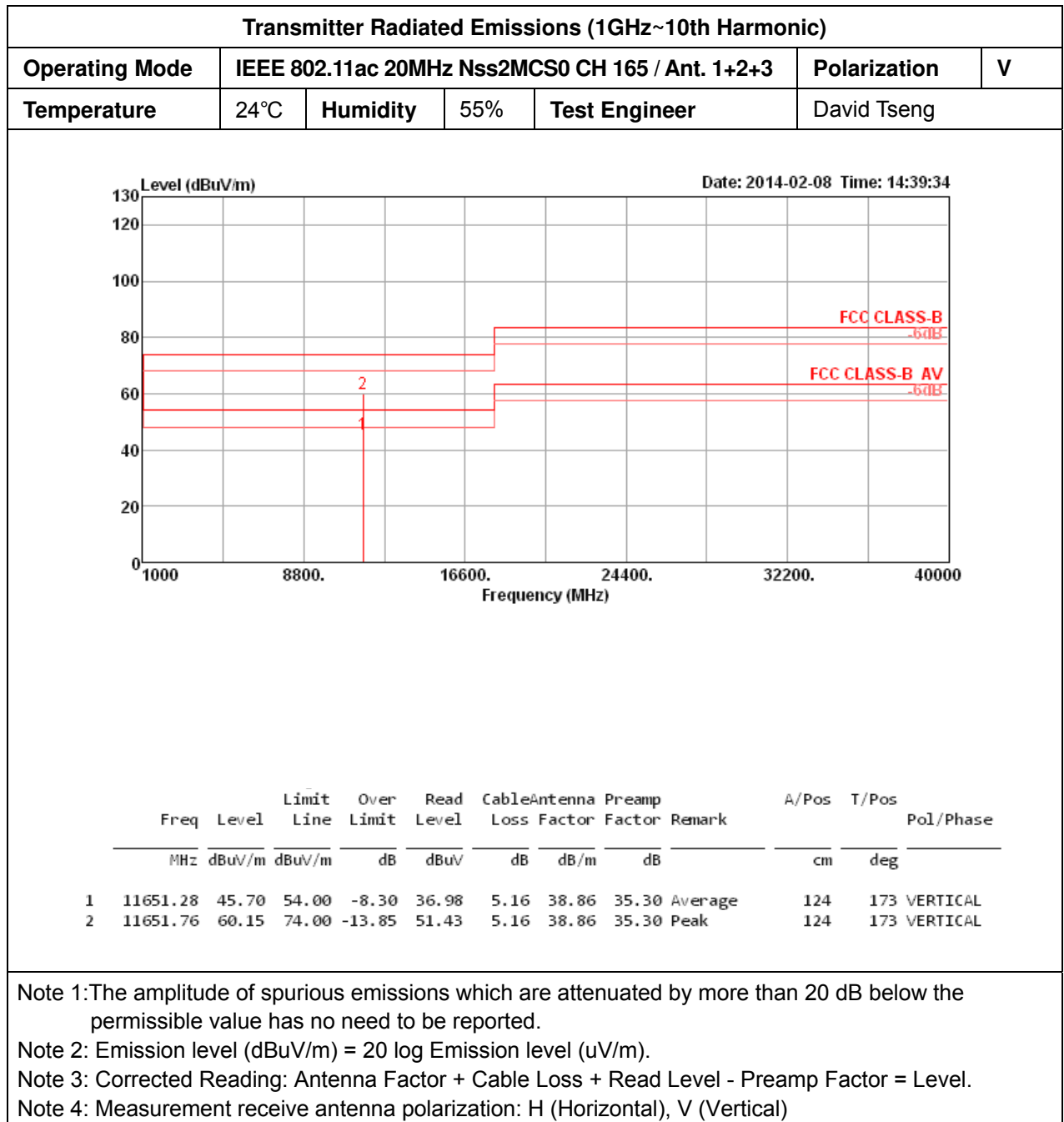


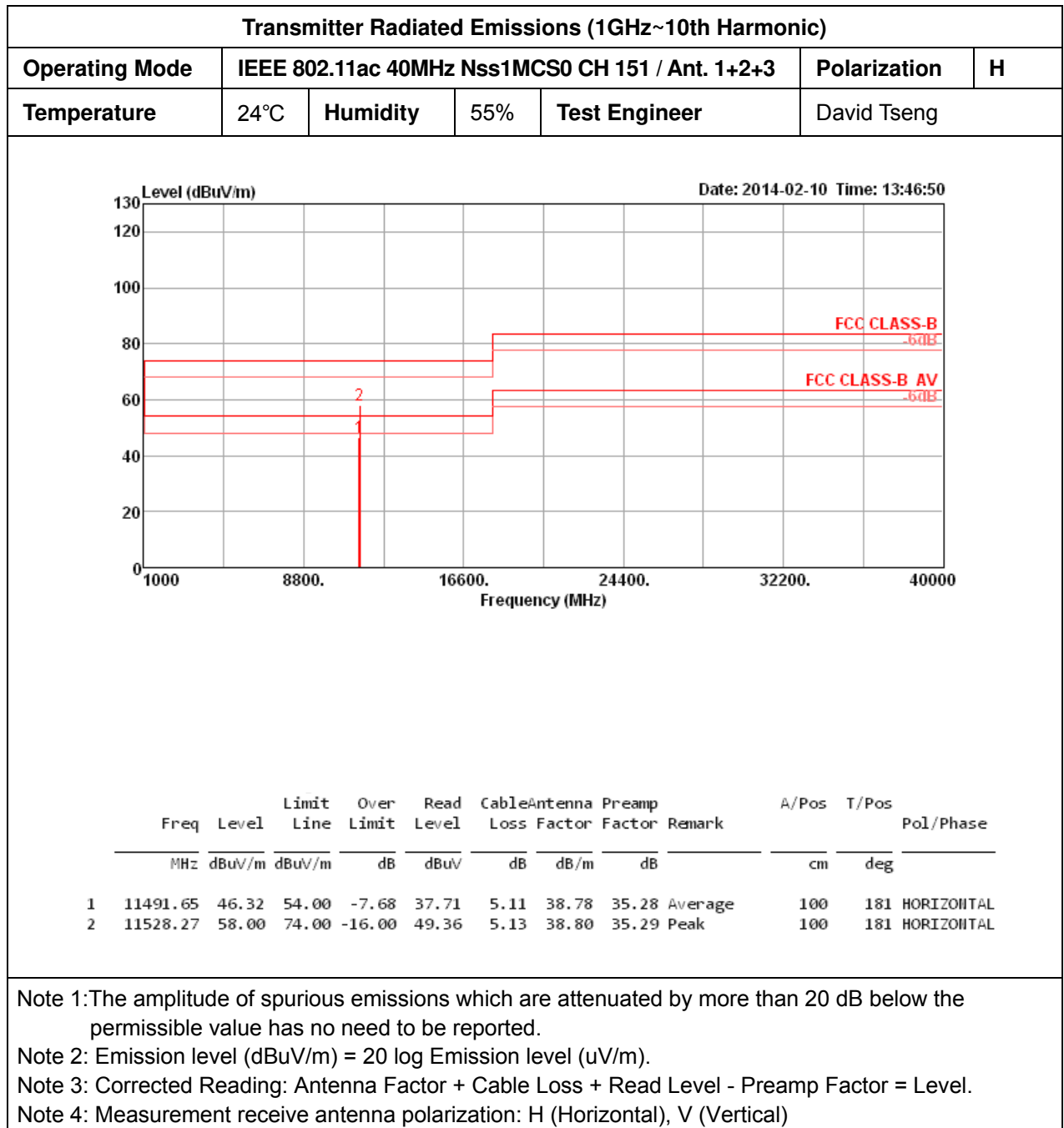


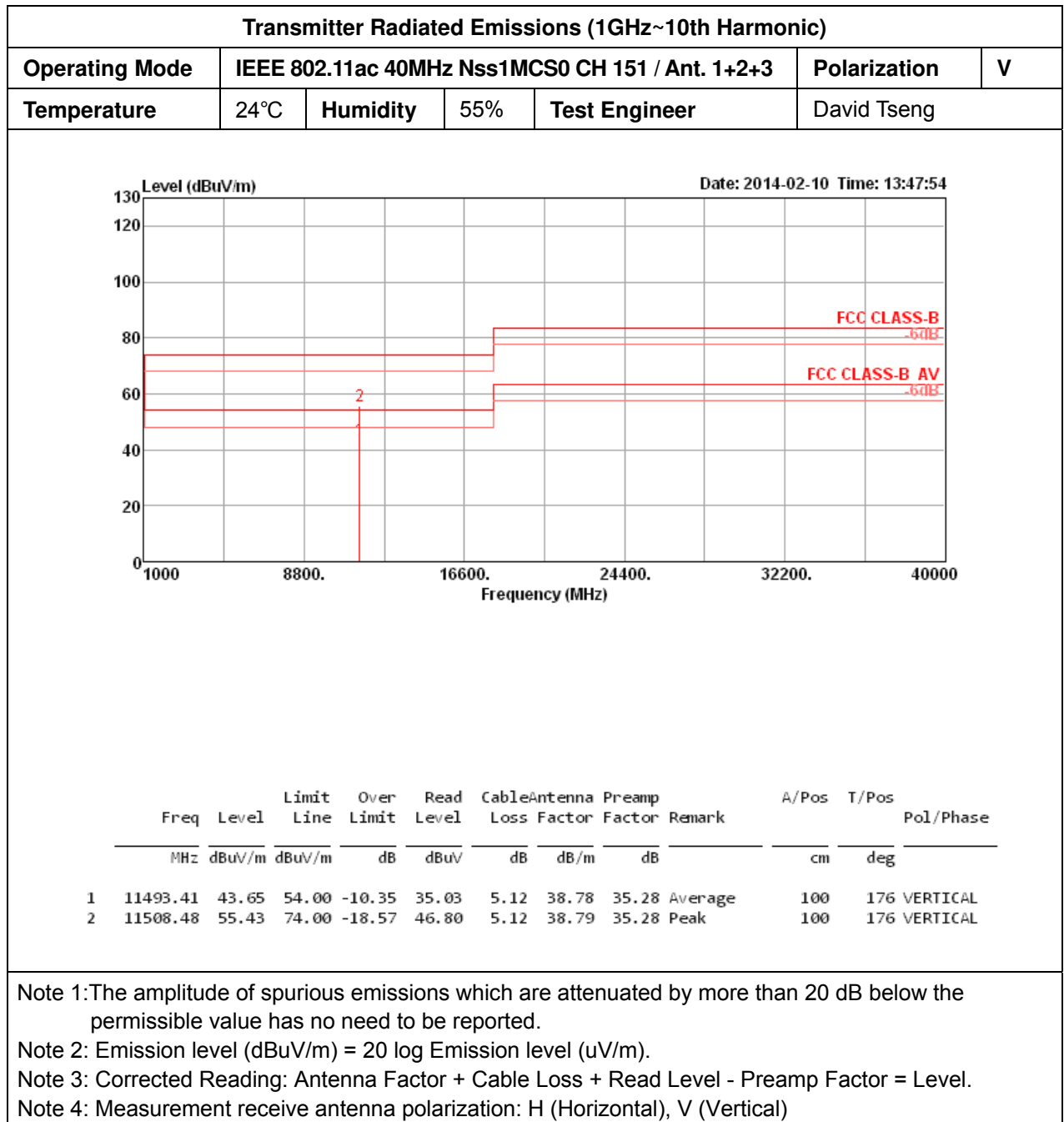


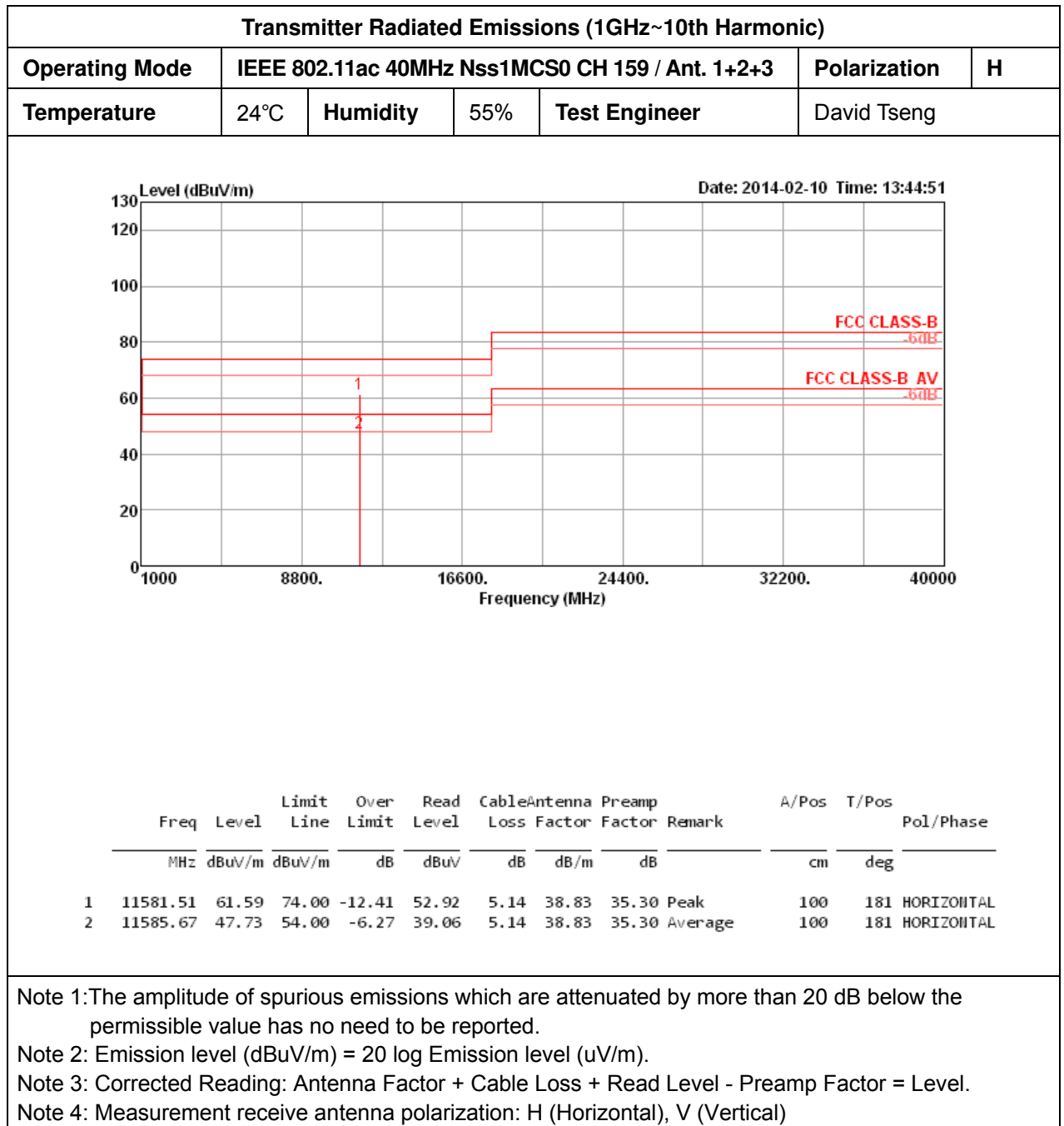


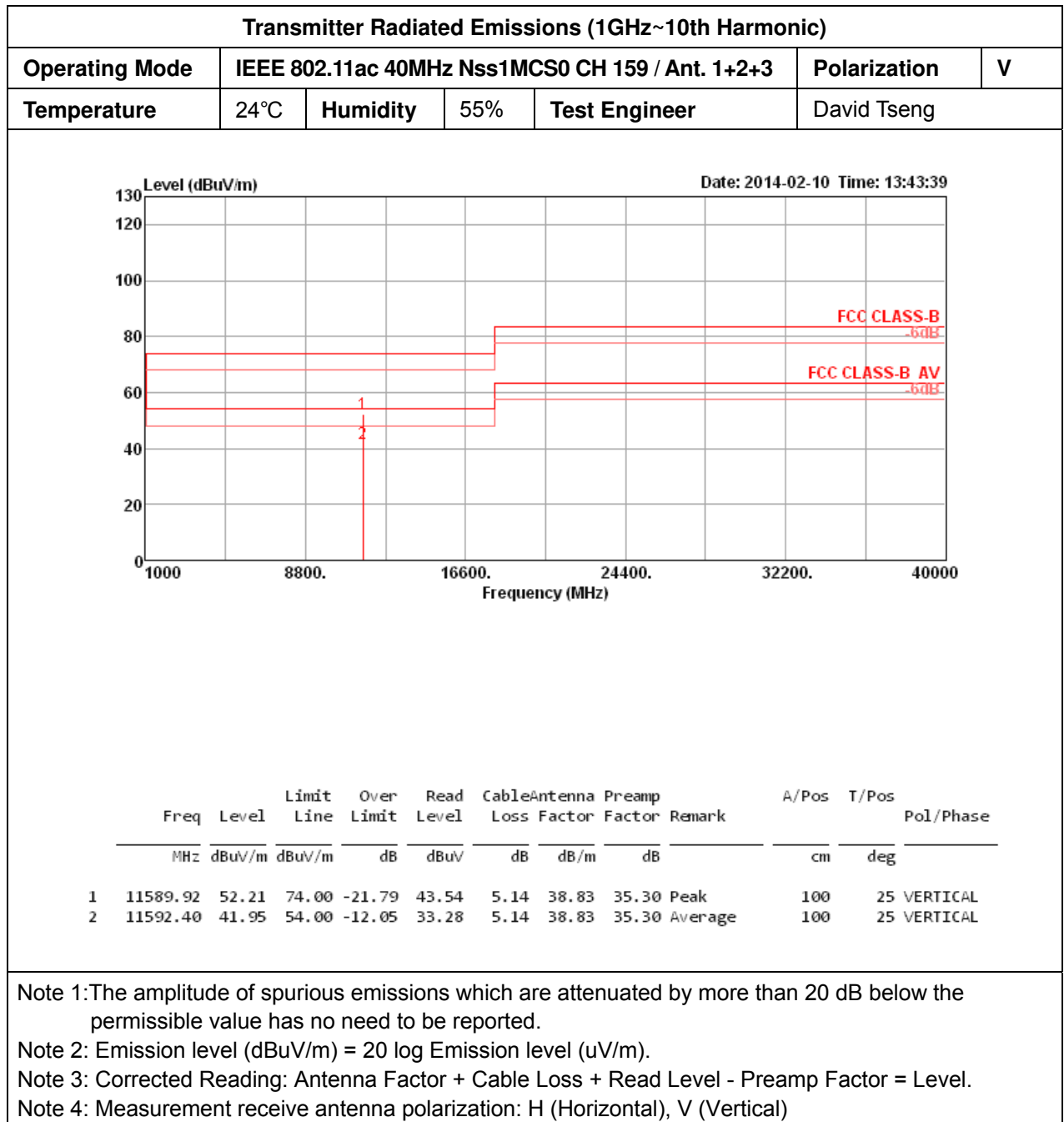


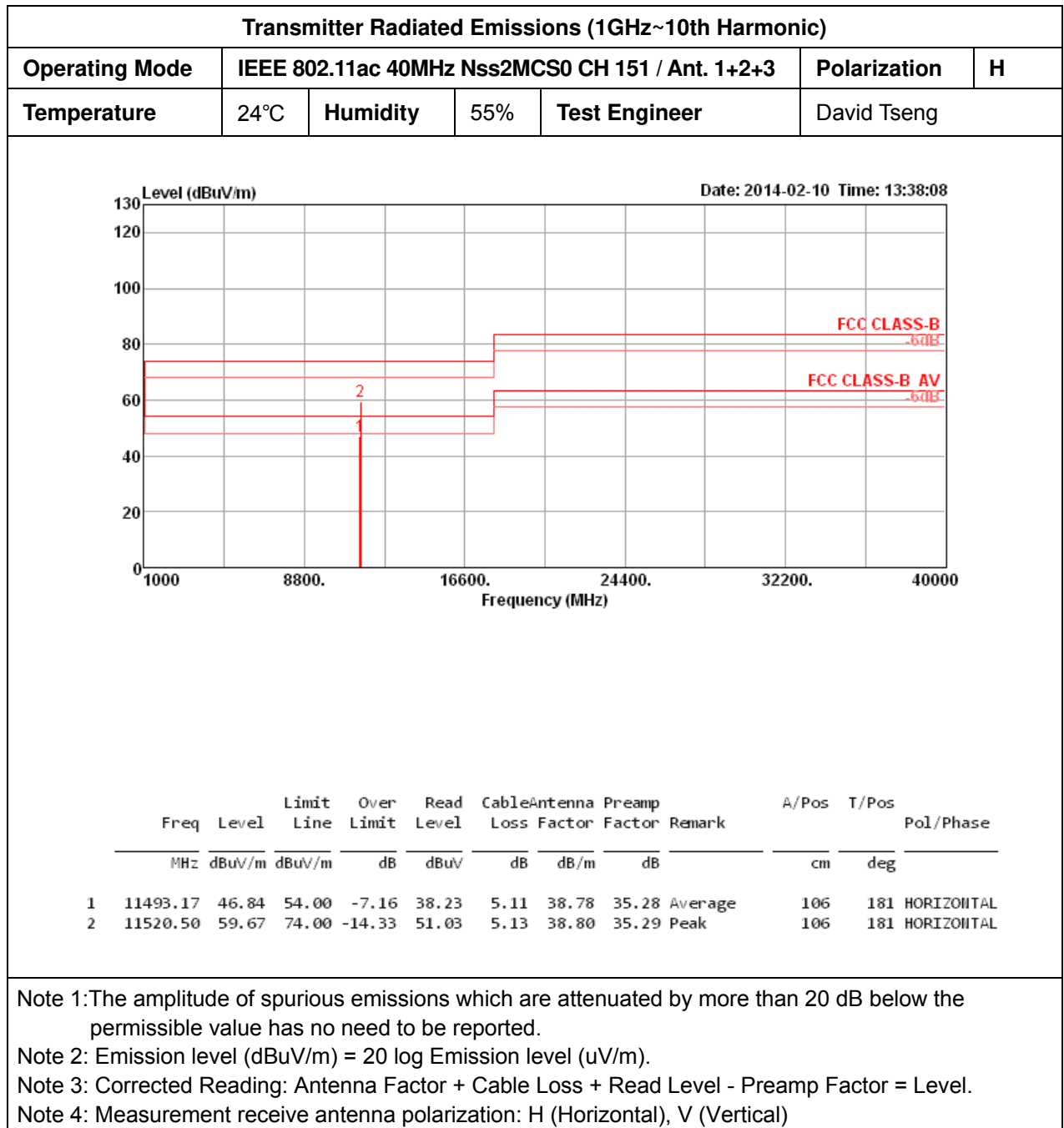


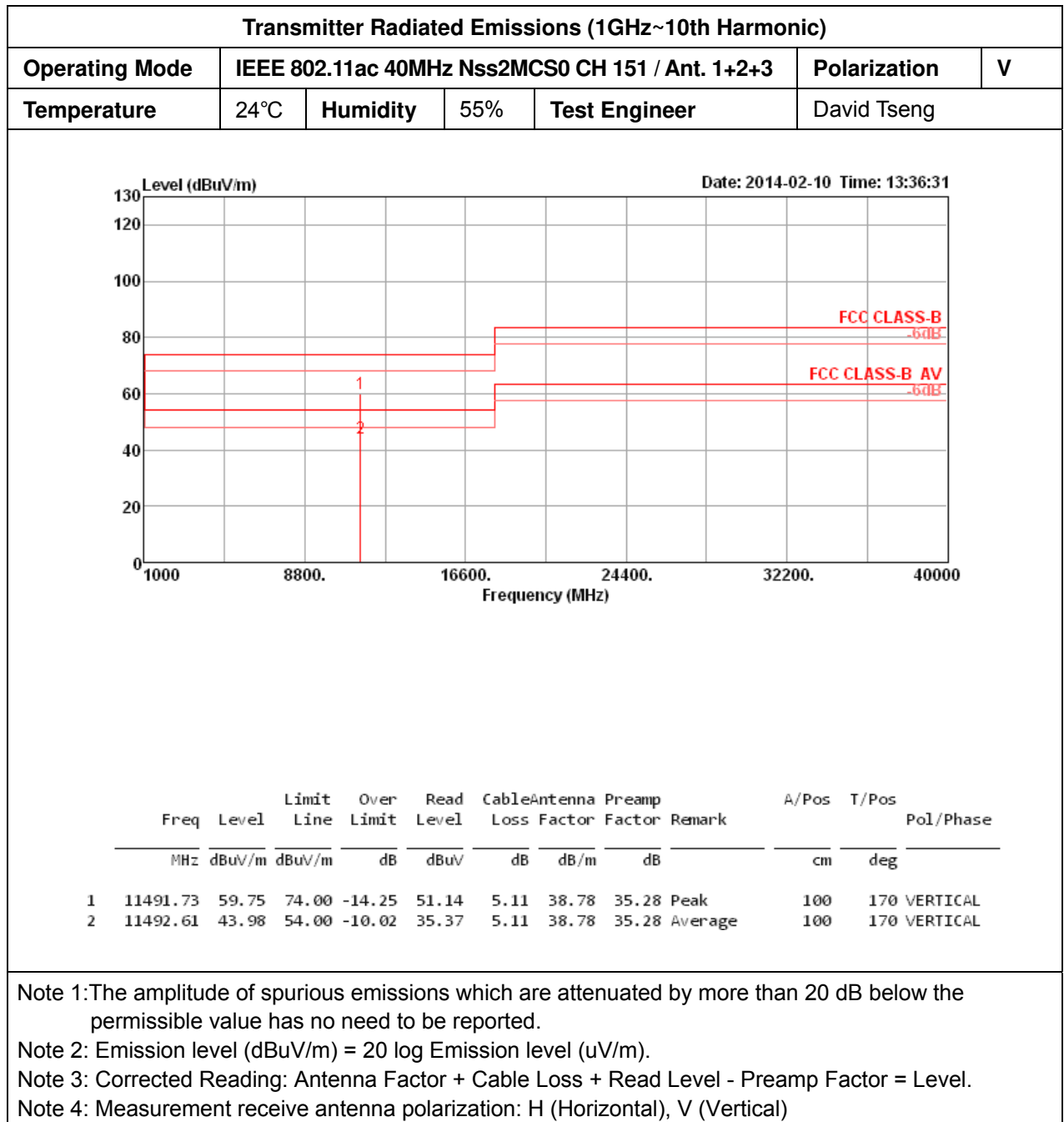


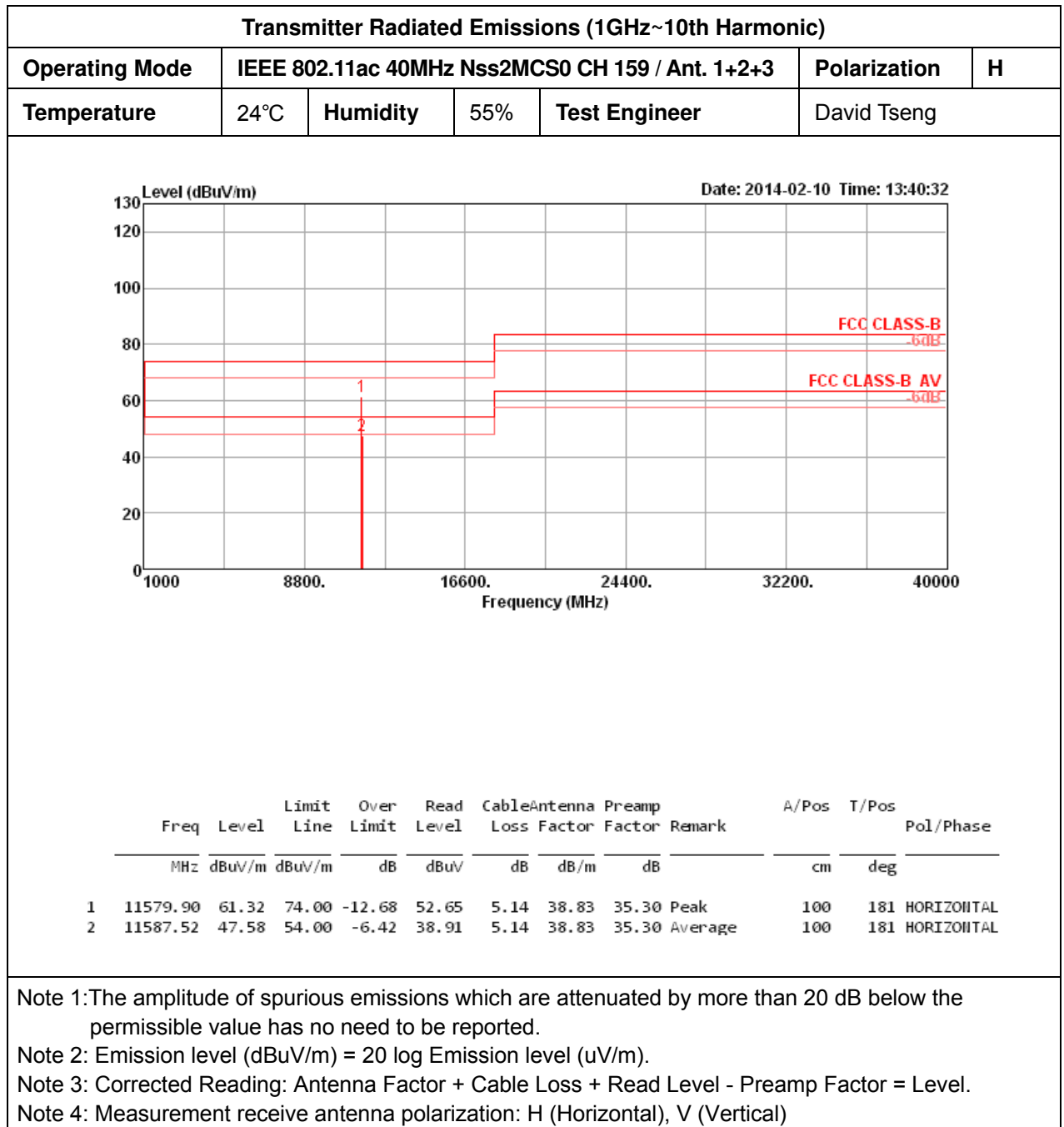


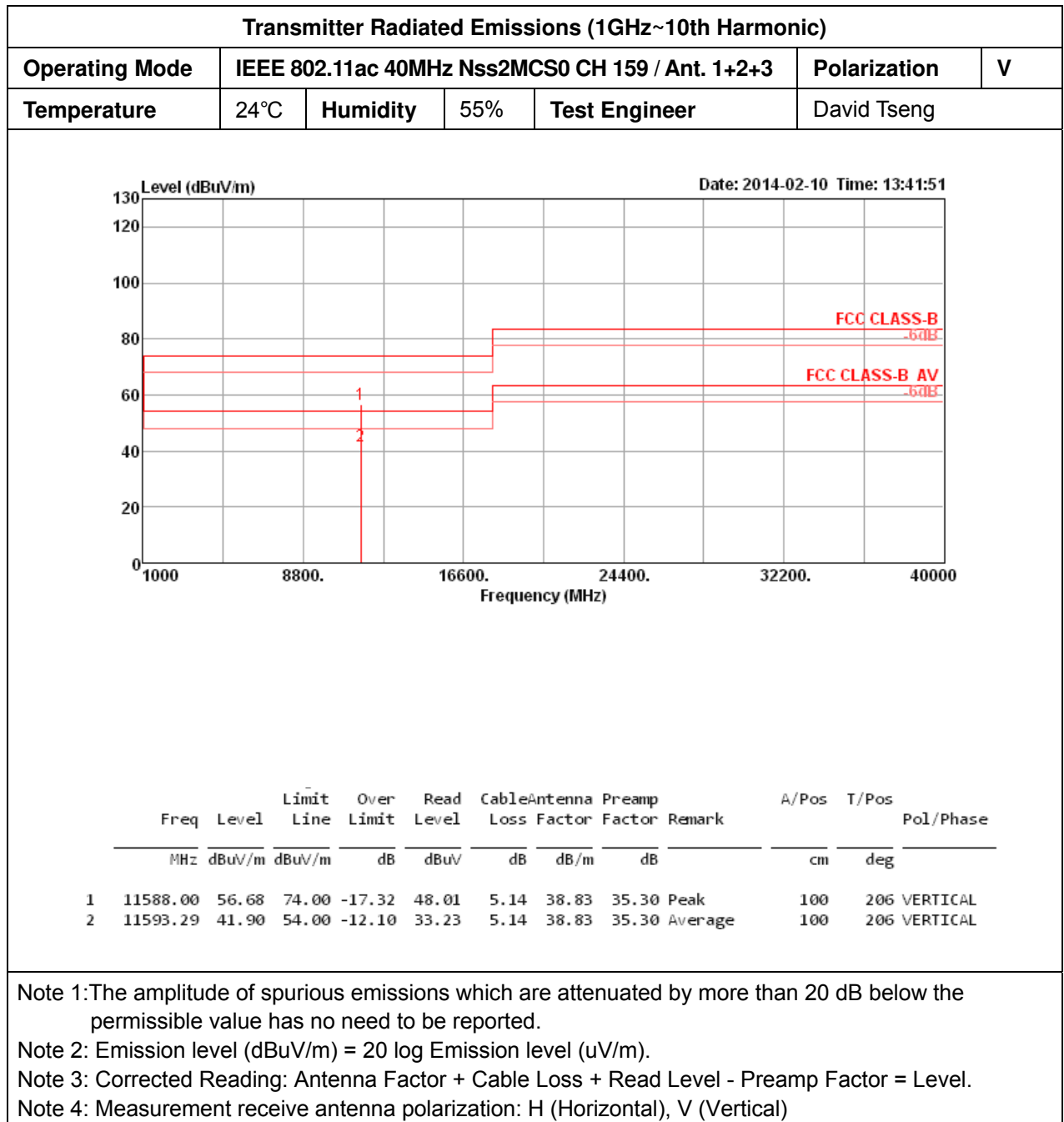


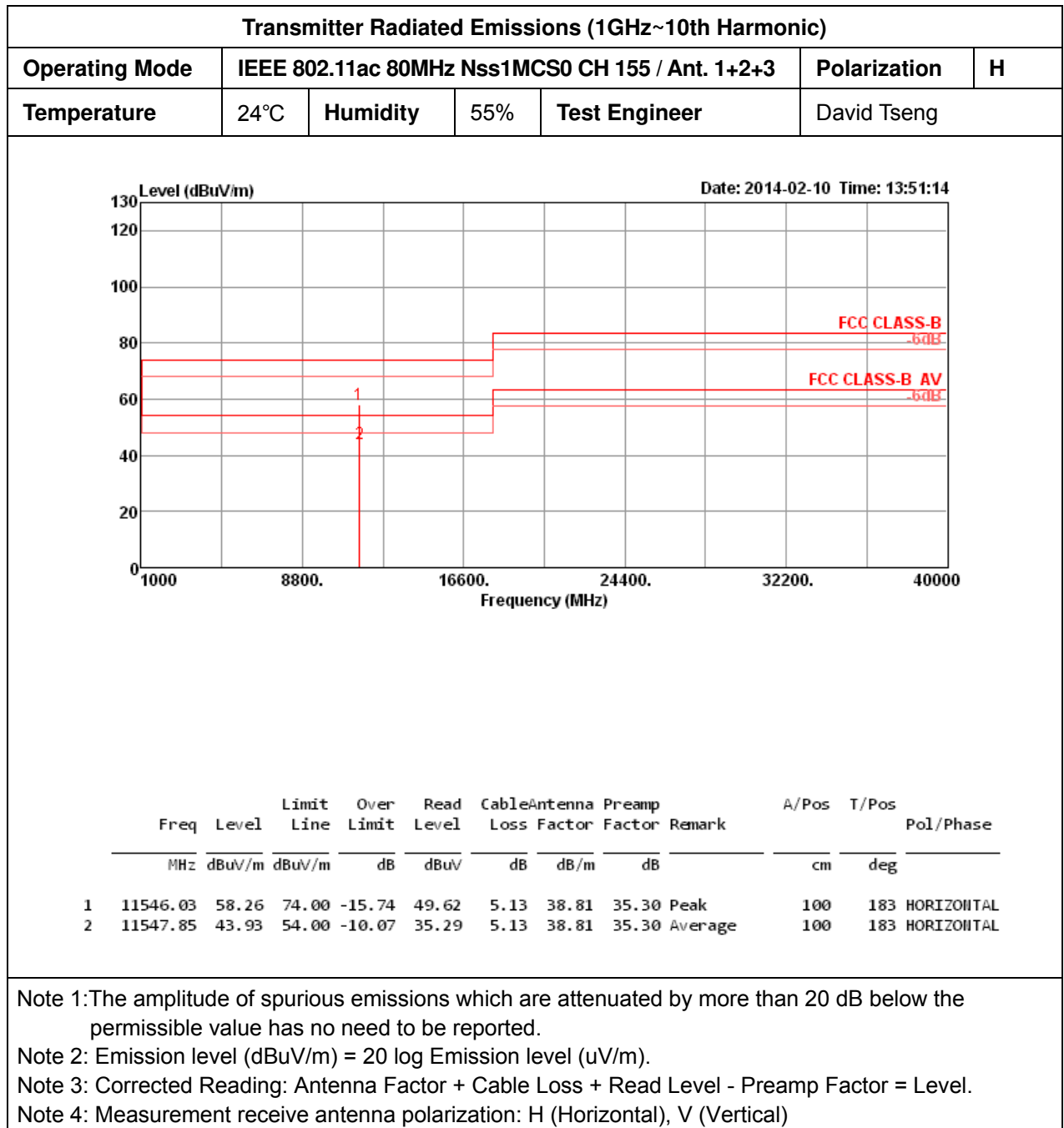


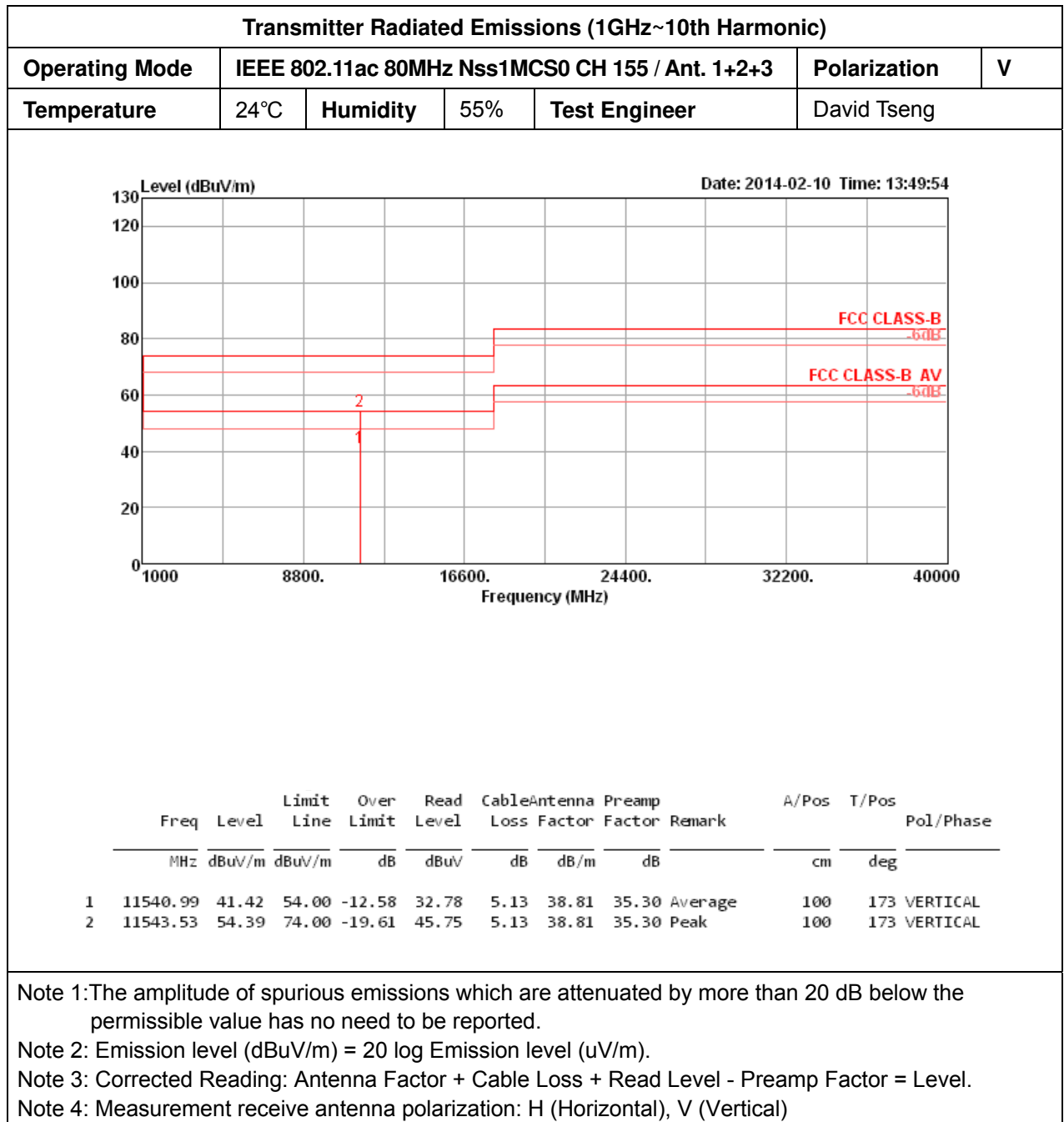


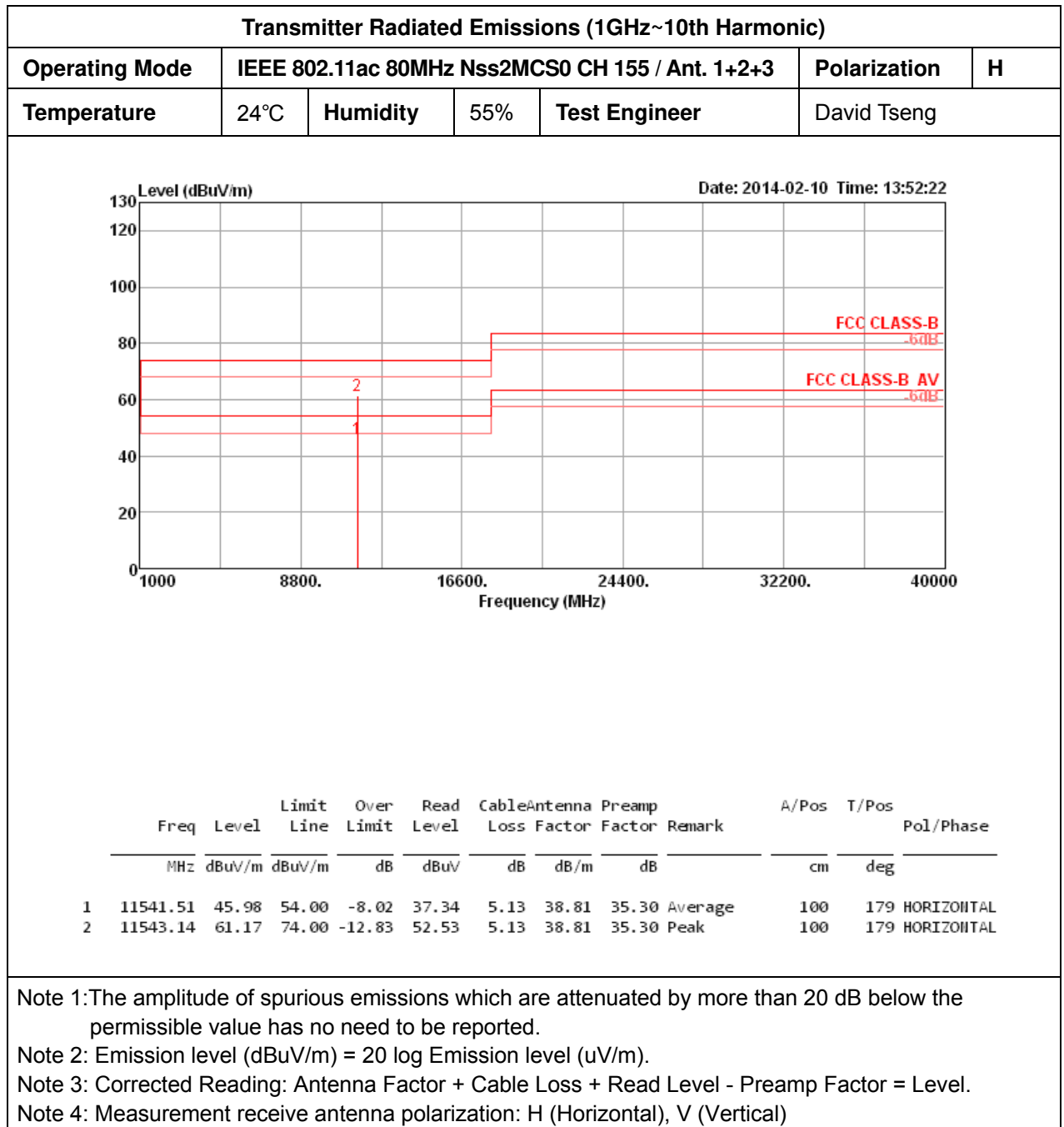


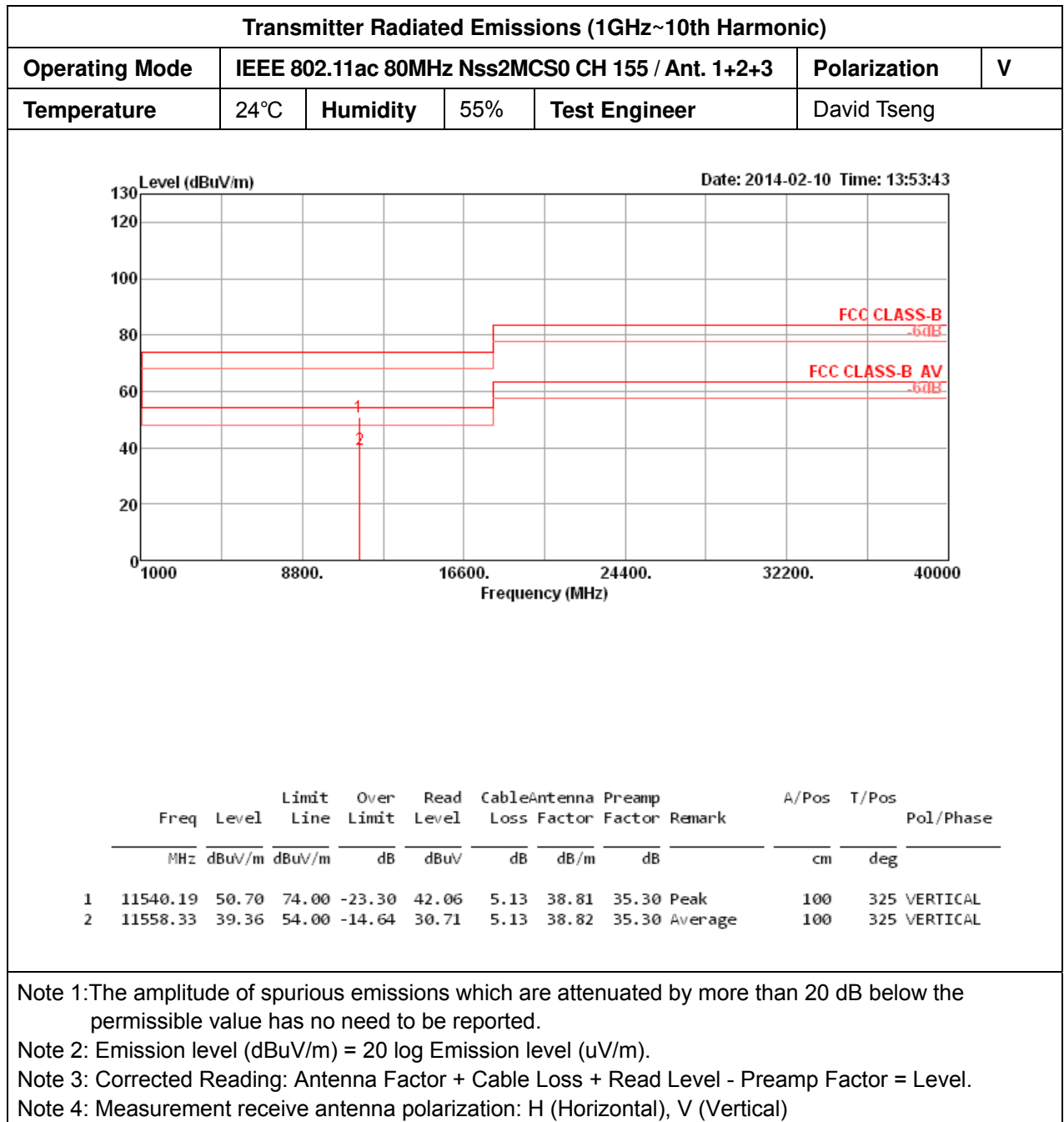












4.6. Band Edge and Fundamental Emissions Measurement

4.6.1. Limit

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (microvolt/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

4.6.2. Measuring Instruments and Setting

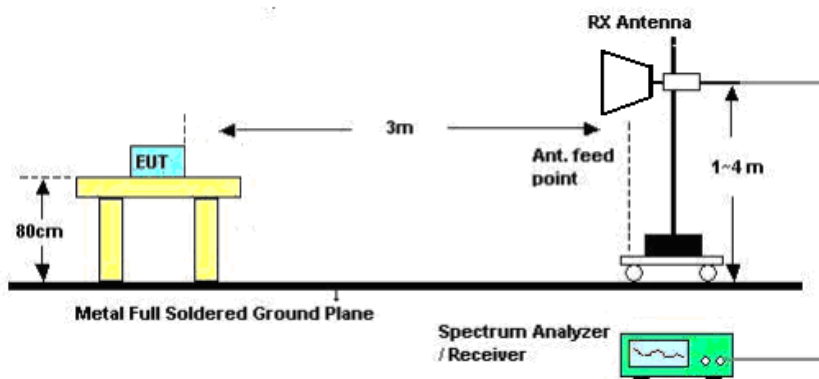
Please refer to section 6 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Analyzer	Setting
Attenuation	Auto
Span Frequency	100 MHz
RBW / VBW (Emission in restricted band)	1MHz / 3MHz for Peak, 1MHz / 10Hz for Average
RBW / VBW (Emission in non-restricted band)	100 kHz /300 kHz for Peak

4.6.3. Test Procedures

1. The test procedure is the same as section 4.5.3, only the frequency range investigated is limited to 100MHz around bandedges.
2. In case the emission is fail due to the used RBW/VBW is too wide, marker-delta method of FCC Public Notice DA00-705 will be followed.

4.6.4. Test Setup Layout



4.6.5. Test Deviation

There is no deviation with the original standard.

4.6.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.6.7. Results of Emission not in Restricted Band

Following channel(s) was (were) selected for the final test as listed below.

For Non-Beamforming

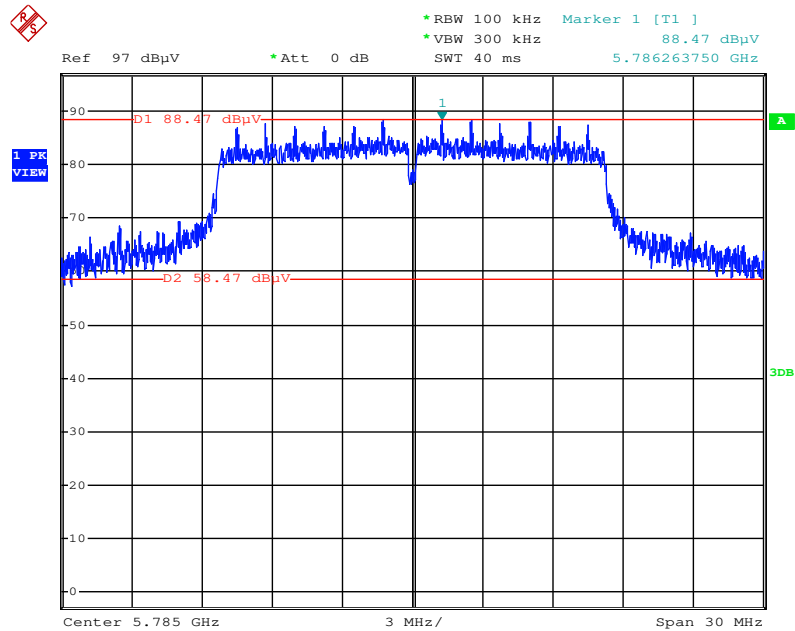
MODE	TX Chain	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	Ant.1	149, 157, 165	OFDM	BPSK	6
802.11a	Ant.1+2+3, CDD	149, 157, 165	OFDM	BPSK	6
802.11ac 20MHz	Ant.1	149, 157, 165	OFDM	BPSK	MCS0 (6.5)
802.11ac 20MHz	Ant.1+2+3, CDD	149, 157, 165	OFDM	BPSK	MCS0 (6.5)
802.11ac 20MHz	Ant.1+2+3, CDD	149, 157, 165	OFDM	BPSK	MCS0 (13)
802.11ac 40MHz	Ant.1	151, 159	OFDM	BPSK	MCS0 (13.5)
802.11ac 40MHz	Ant.1+2+3, CDD	151, 159	OFDM	BPSK	MCS0 (13.5)
802.11ac 40MHz	Ant.1+2+3, CDD	151, 159	OFDM	BPSK	MCS0 (27)
802.11ac 80MHz	Ant.3	155	OFDM	BPSK	MCS0 (29.3)
802.11ac 80MHz	Ant.1+2+3, CDD	155	OFDM	BPSK	MCS0 (29.3)
802.11ac 80MHz	Ant.1+2+3, CDD	155	OFDM	BPSK	MCS0 (58.5)

For Beamforming

MODE	TX Chain	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11ac 20MHz	Ant.1+2+3, CDD	149, 157, 165	OFDM	BPSK	MCS0 (6.5)
802.11ac 20MHz	Ant.1+2+3, CDD	149, 157, 165	OFDM	BPSK	MCS0 (13)
802.11ac 40MHz	Ant.1+2+3, CDD	151, 159	OFDM	BPSK	MCS0 (13.5)
802.11ac 40MHz	Ant.1+2+3, CDD	151, 159	OFDM	BPSK	MCS0 (27)
802.11ac 80MHz	Ant.1+2+3, CDD	155	OFDM	BPSK	MCS0 (29.3)
802.11ac 80MHz	Ant.1+2+3, CDD	155	OFDM	BPSK	MCS0 (58.5)

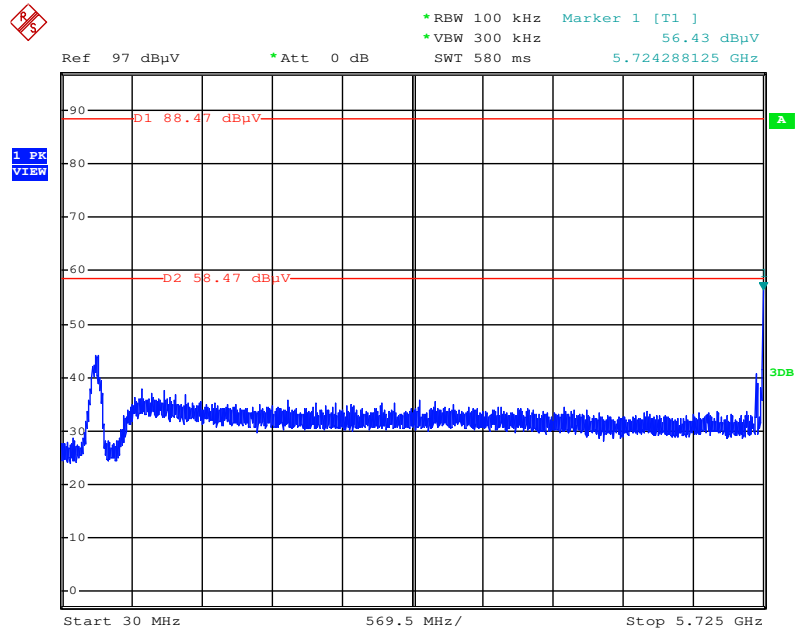
For Non-Beamforming

Low Band Edge Plot on Configuration IEEE 802.11a / Reference Level / Ant. 1



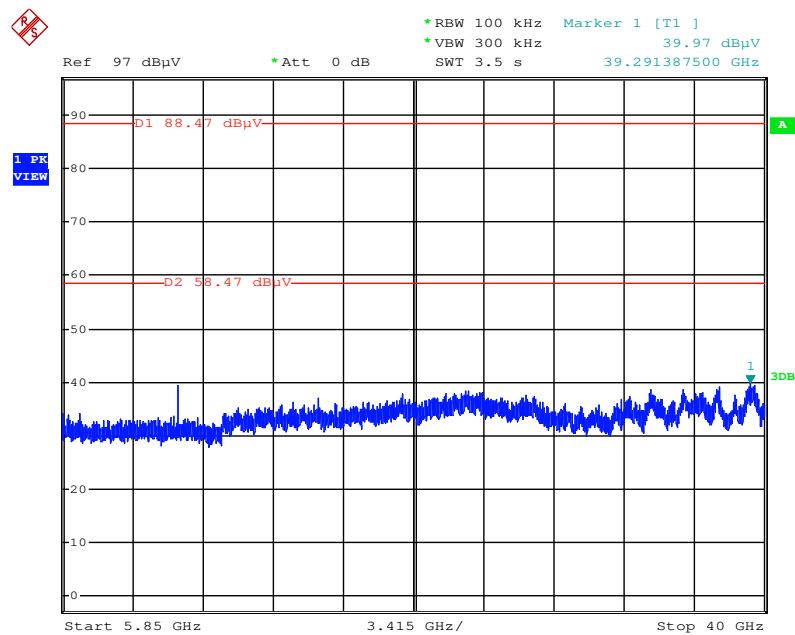
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Low Band Edge Plot on Configuration IEEE 802.11a / CH 149 / Ant. 1



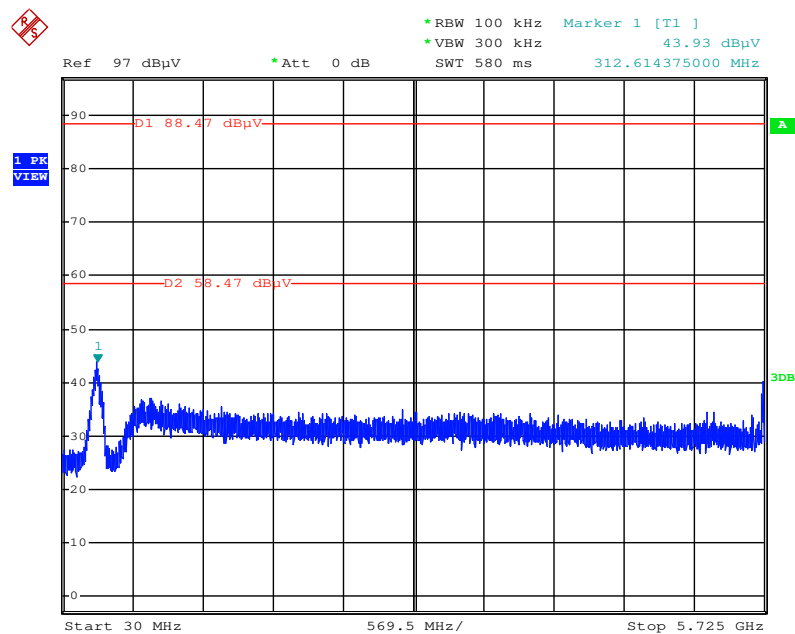
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Low Band Edge Plot on Configuration IEEE 802.11a / CH 149 / Ant. 1



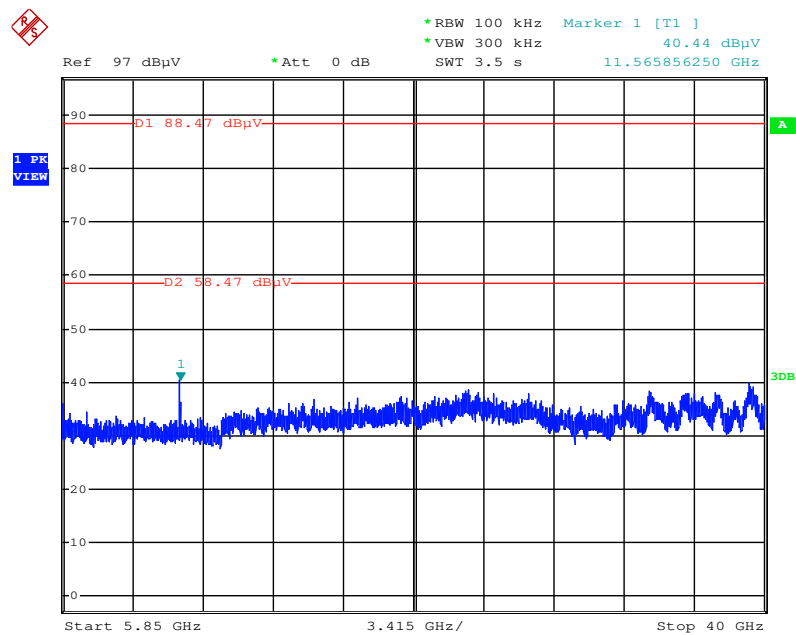
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Low Band Edge Plot on Configuration IEEE 802.11a / CH 157 / Ant. 1



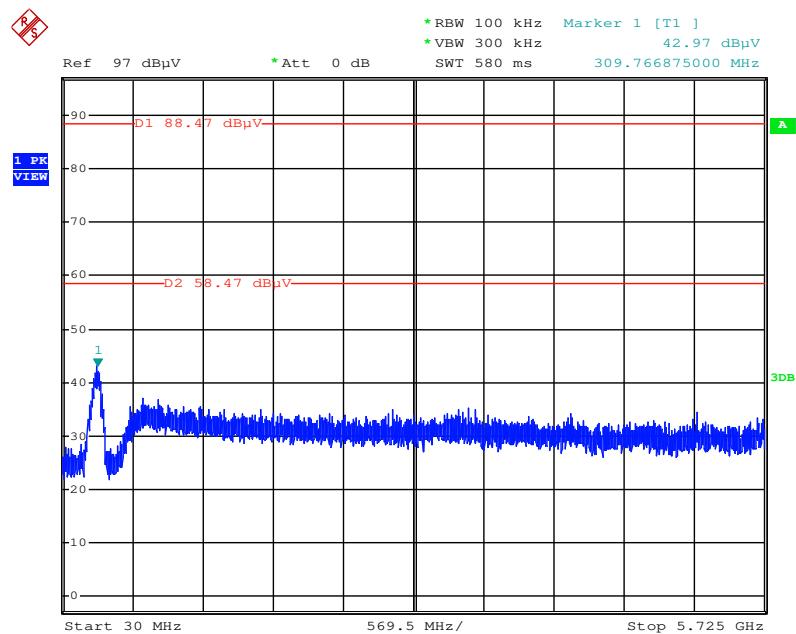
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Low Band Edge Plot on Configuration IEEE 802.11a / CH 157 / Ant. 1



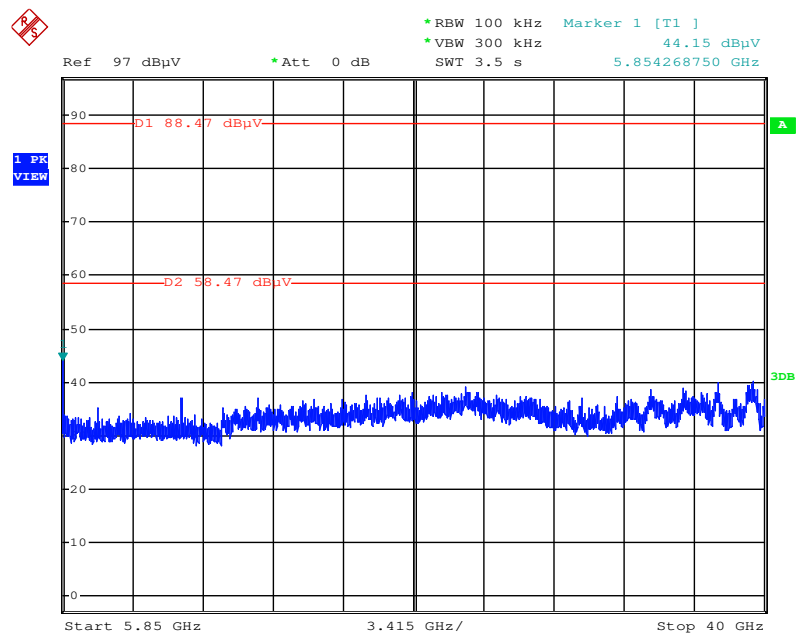
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Low Band Edge Plot on Configuration IEEE 802.11a / CH 165 / Ant. 1



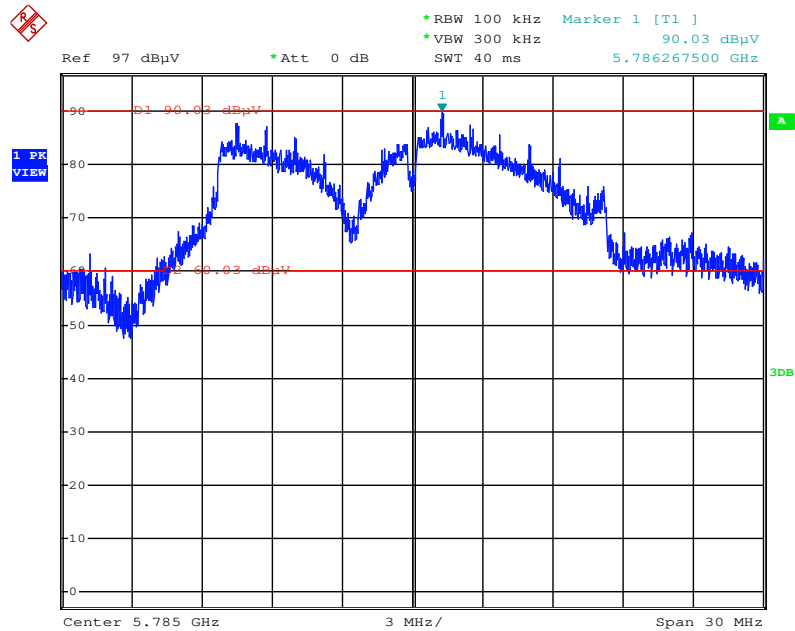
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Low Band Edge Plot on Configuration IEEE 802.11a / CH 165 / Ant. 1



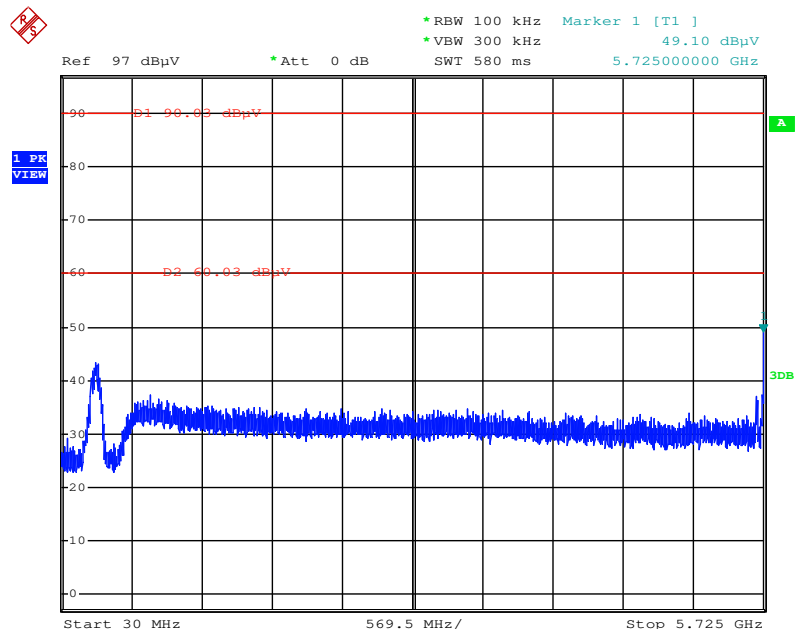
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Low Band Edge Plot on Configuration IEEE 802.11a / Reference Level / Ant. 1+2+3



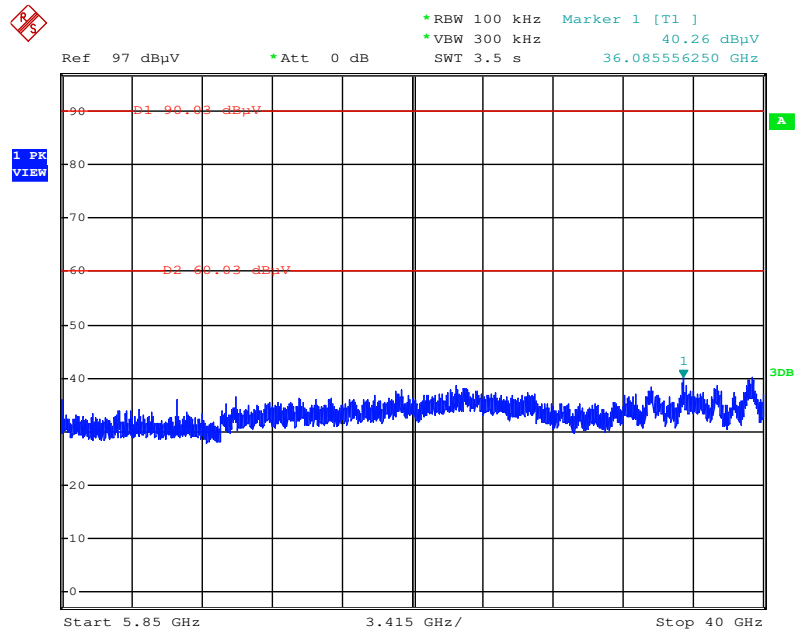
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Low Band Edge Plot on Configuration IEEE 802.11a / CH 149 / Ant. 1+2+3



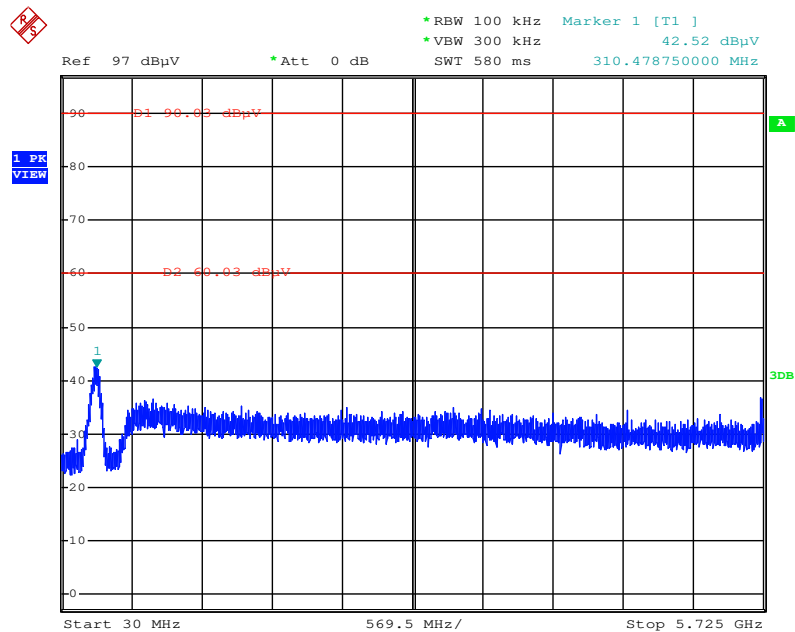
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Low Band Edge Plot on Configuration IEEE 802.11a / CH 149 / Ant. 1+2+3



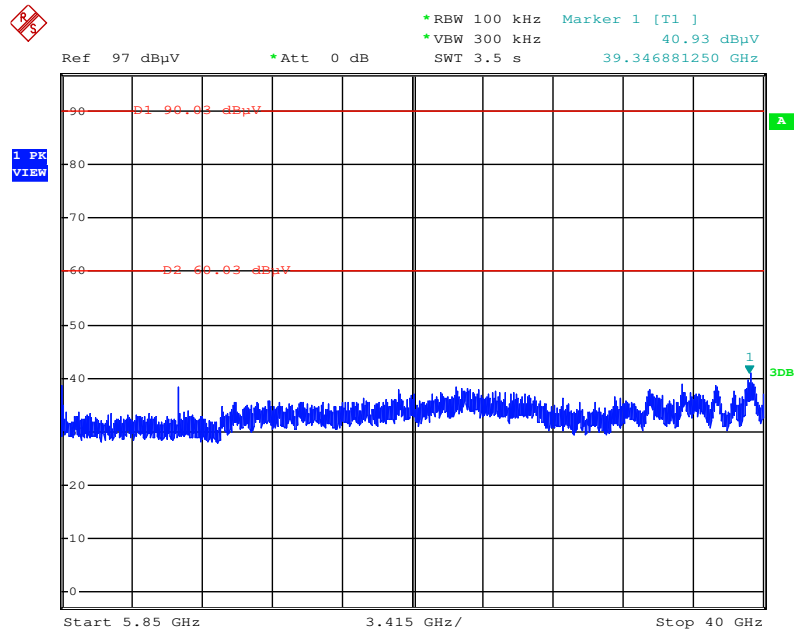
Date: 7.FEB.2014 22:14:02

Low Band Edge Plot on Configuration IEEE 802.11a / CH 157 / Ant. 1+2+3



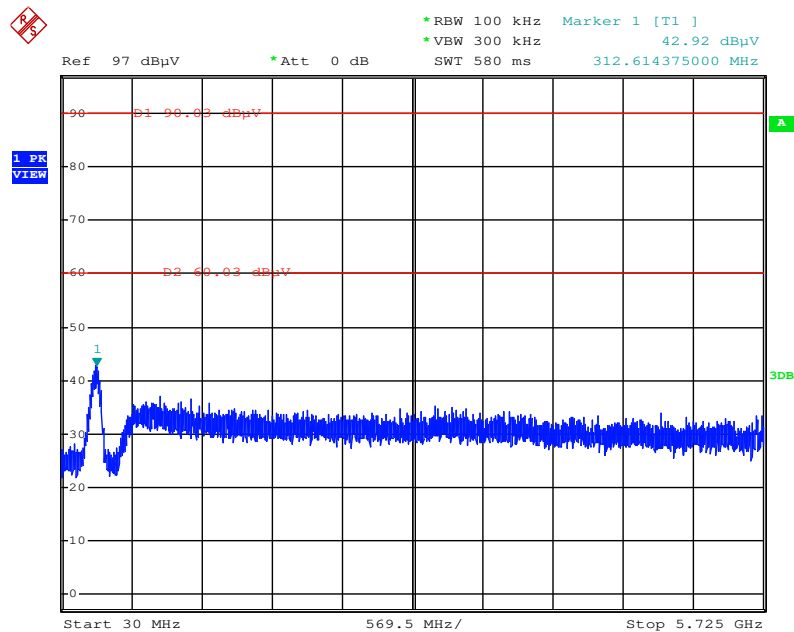
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Low Band Edge Plot on Configuration IEEE 802.11a / CH 157 / Ant. 1+2+3



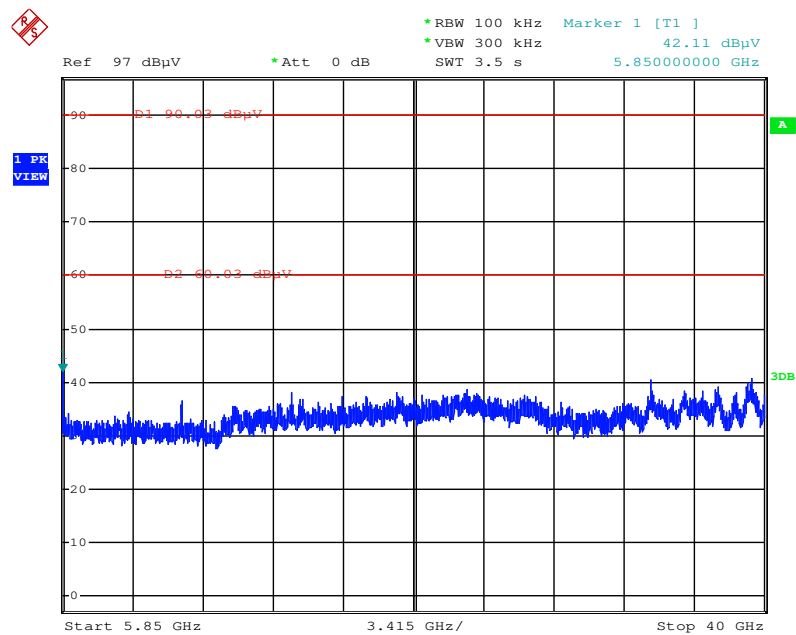
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Low Band Edge Plot on Configuration IEEE 802.11a / CH 165 / Ant. 1+2+3



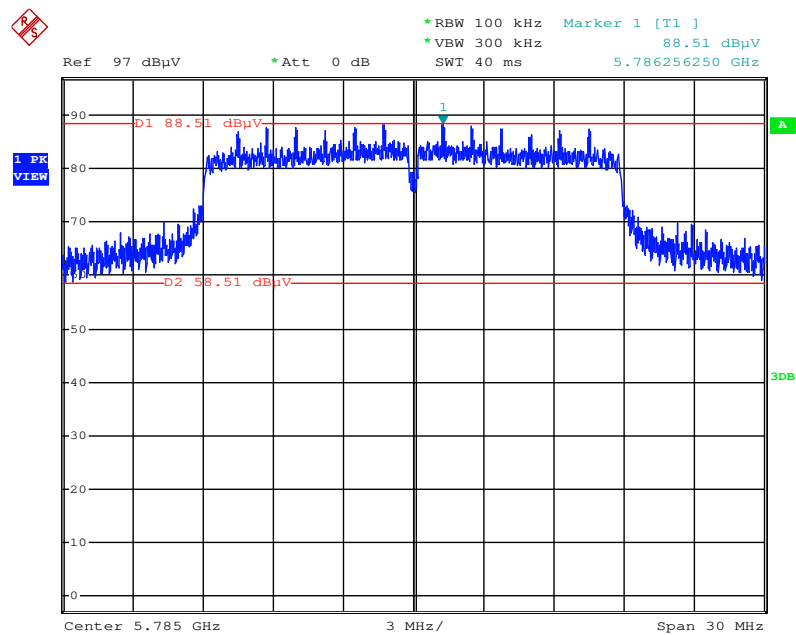
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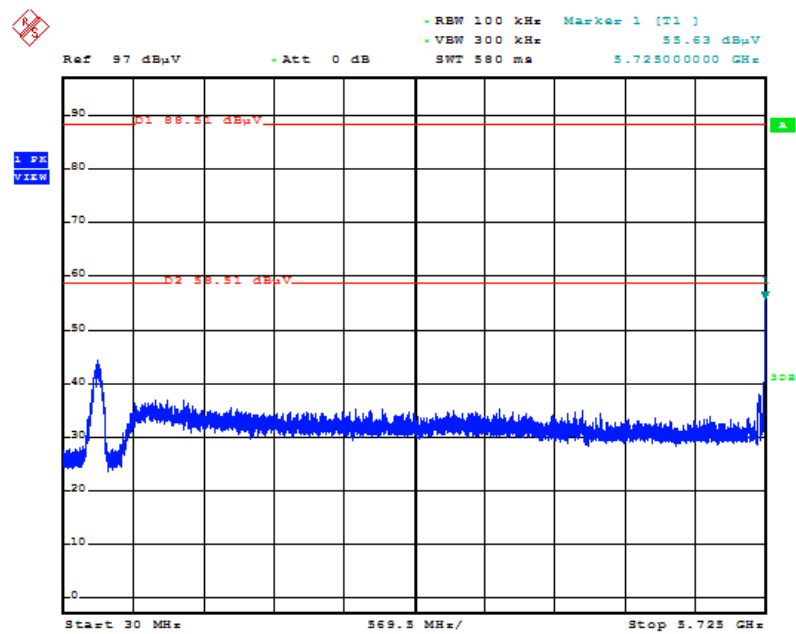
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Low Band Edge Plot on Configuration IEEE 802.11ac 20MHz / Reference Level / Ant. 1



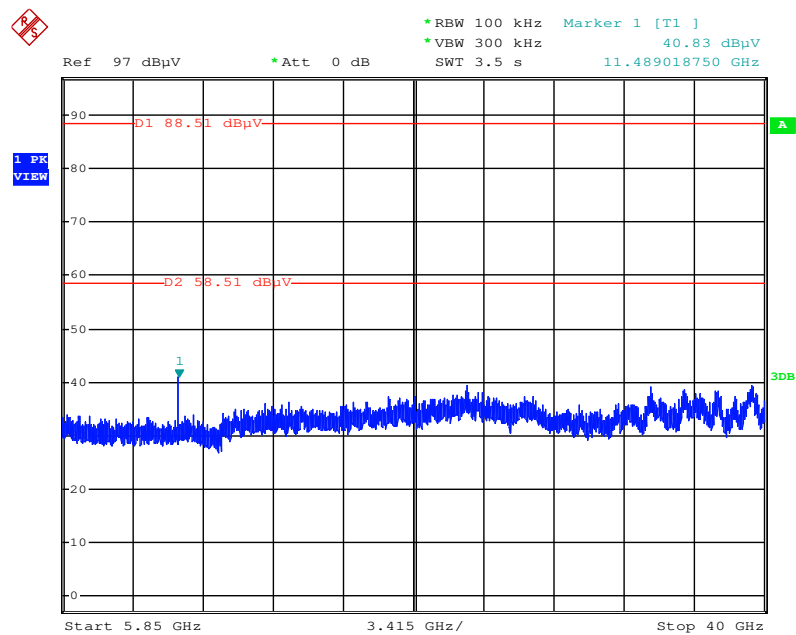
Date: 7.FEB.2014 20:57:11

Low Band Edge Plot on Configuration IEEE 802.11ac 20MHz Nss1MCS0 / CH 149 / Ant. 1



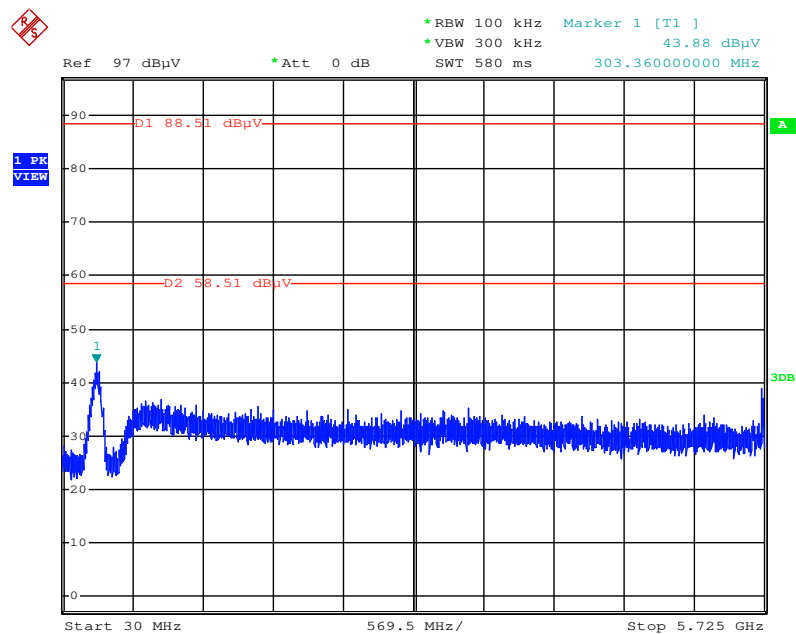
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Low Band Edge Plot on Configuration IEEE 802.11ac 20MHz Nss1MCS0 / CH 149 / Ant. 1



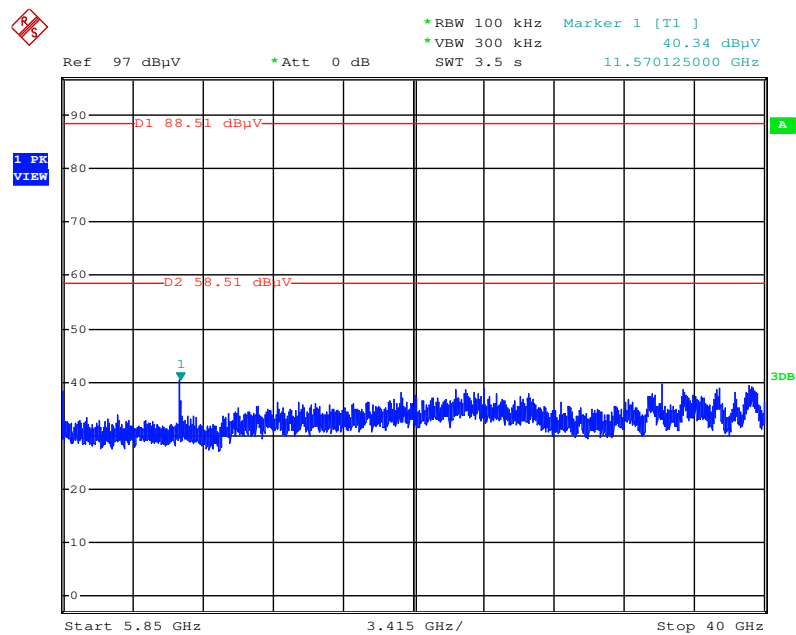
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Low Band Edge Plot on Configuration IEEE 802.11ac 20MHz Nss1MCS0 / CH 157 / Ant. 1



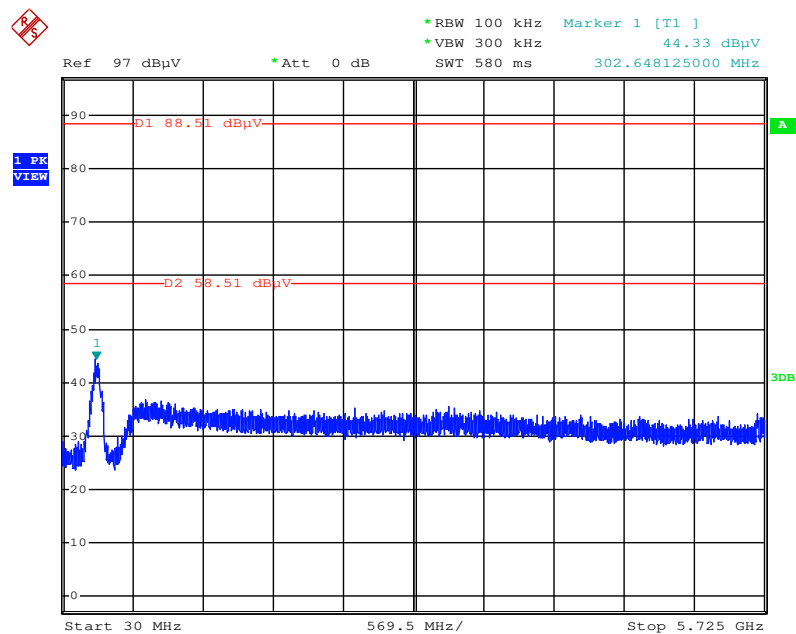
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Low Band Edge Plot on Configuration IEEE 802.11ac 20MHz Nss1MCS0 / CH 157 / Ant. 1



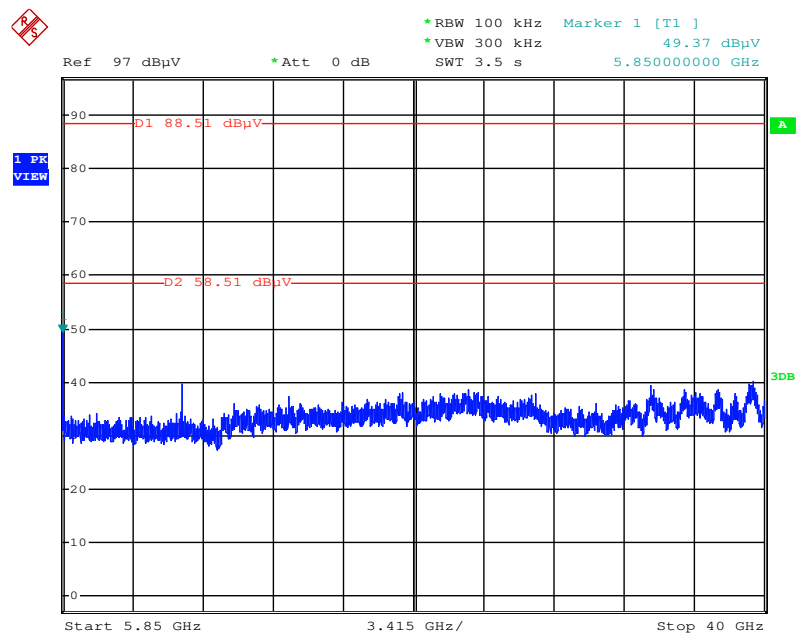
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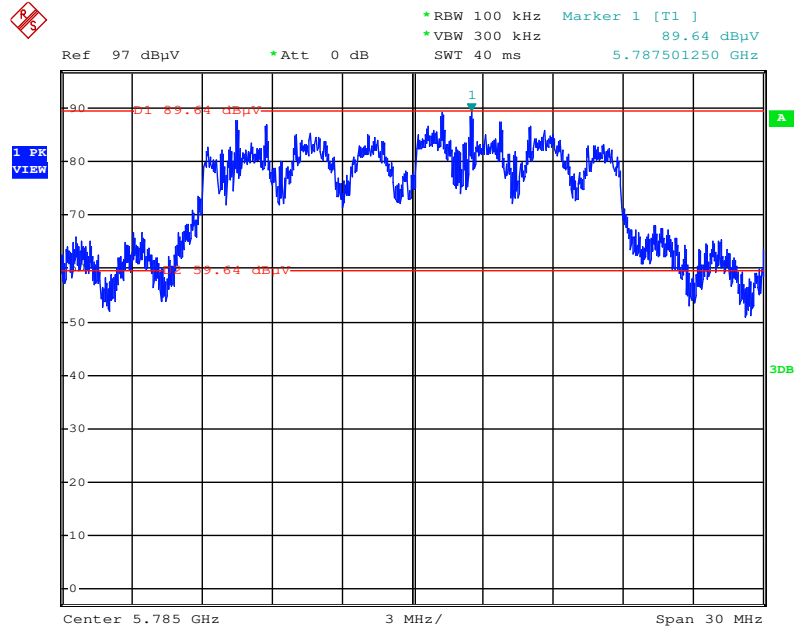
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Low Band Edge Plot on Configuration IEEE 802.11ac 20MHz Nss1MCS0 / CH 165 / Ant. 1



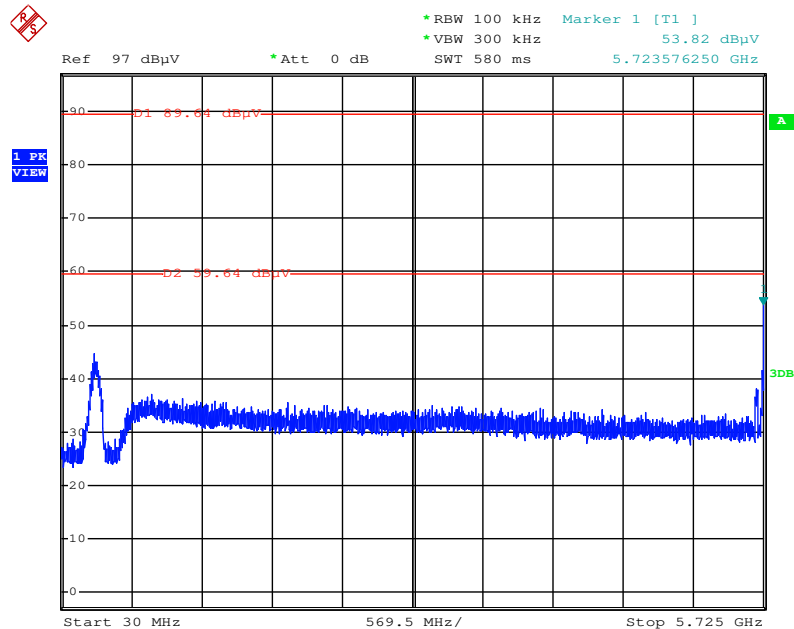
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Low Band Edge Plot on Configuration IEEE 802.11ac 20MHz Nss1MCS0 / Reference Level /
Ant. 1+2+3



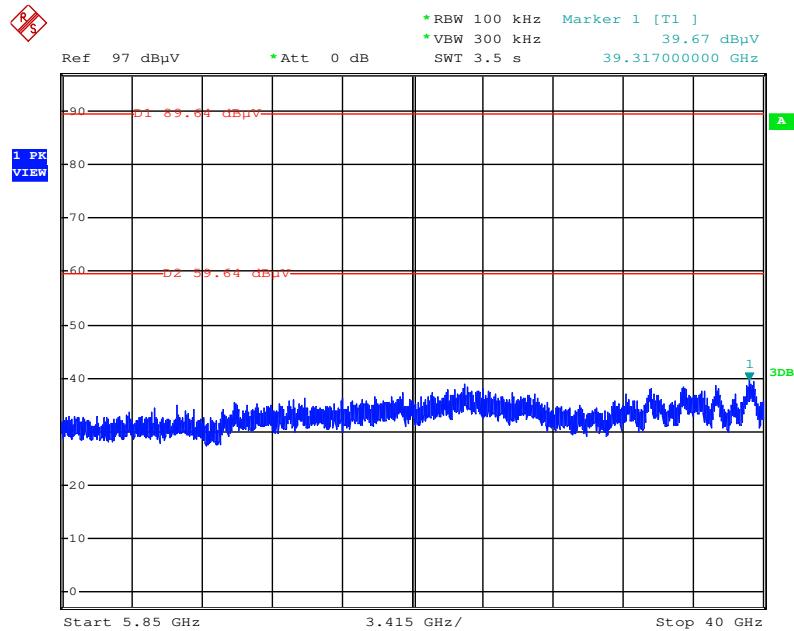
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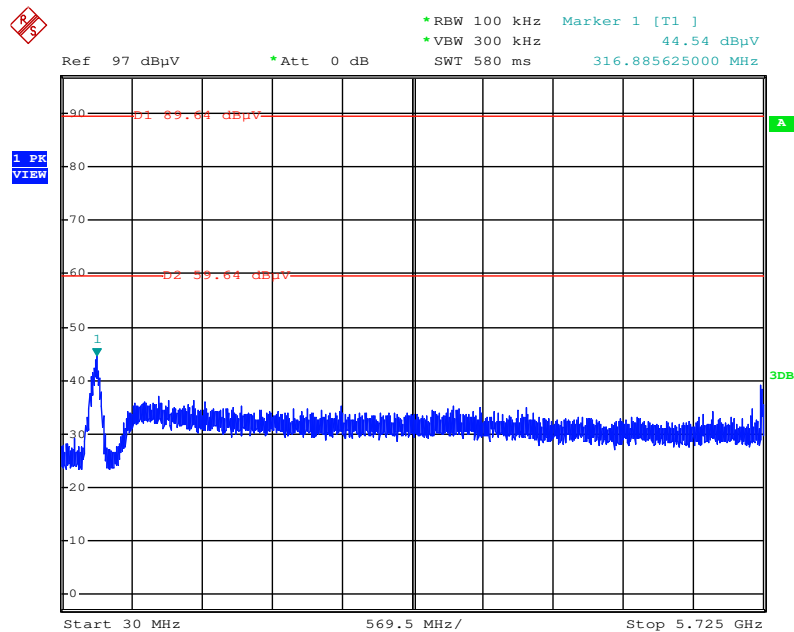
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Low Band Edge Plot on Configuration IEEE 802.11ac 20MHz Nss1MCS0 / CH 149 / Ant. 1+2+3



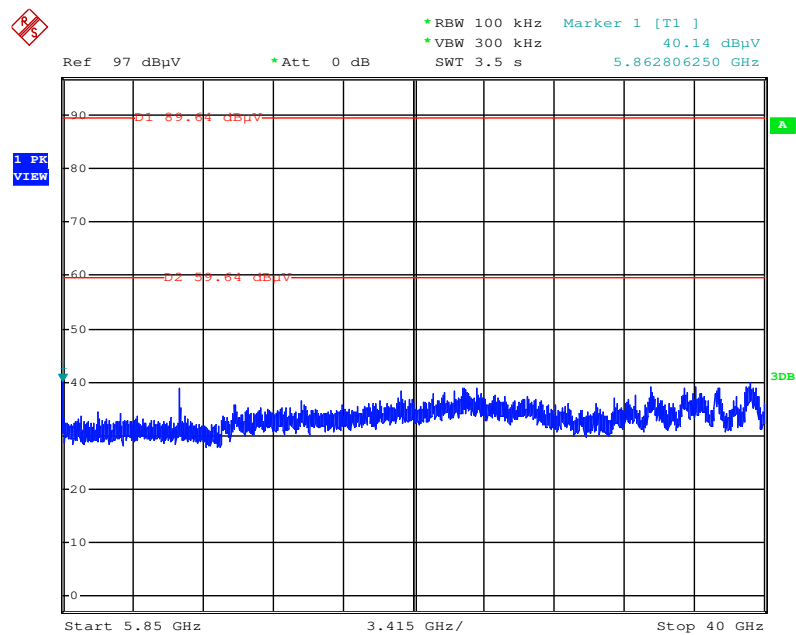
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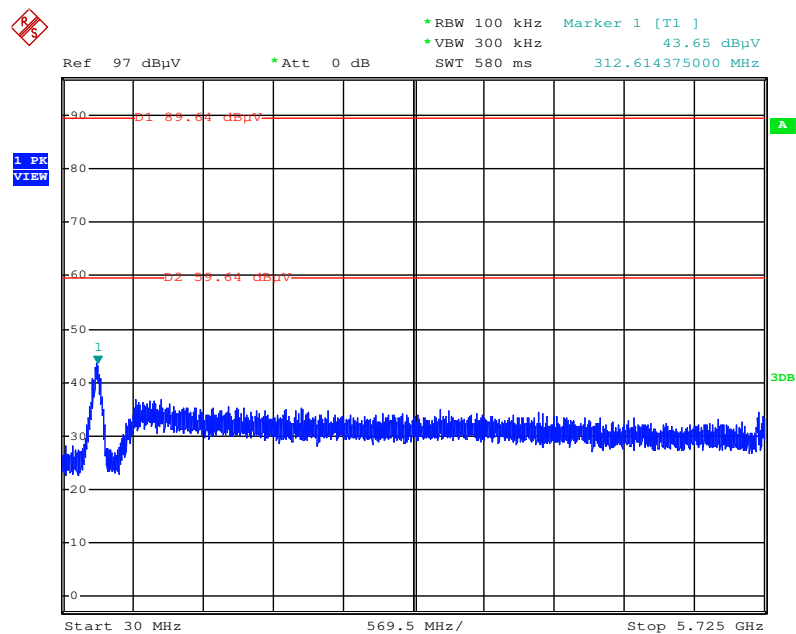
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Low Band Edge Plot on Configuration IEEE 802.11ac 20MHz Nss1MCS0 / CH 157 / Ant. 1+2+3



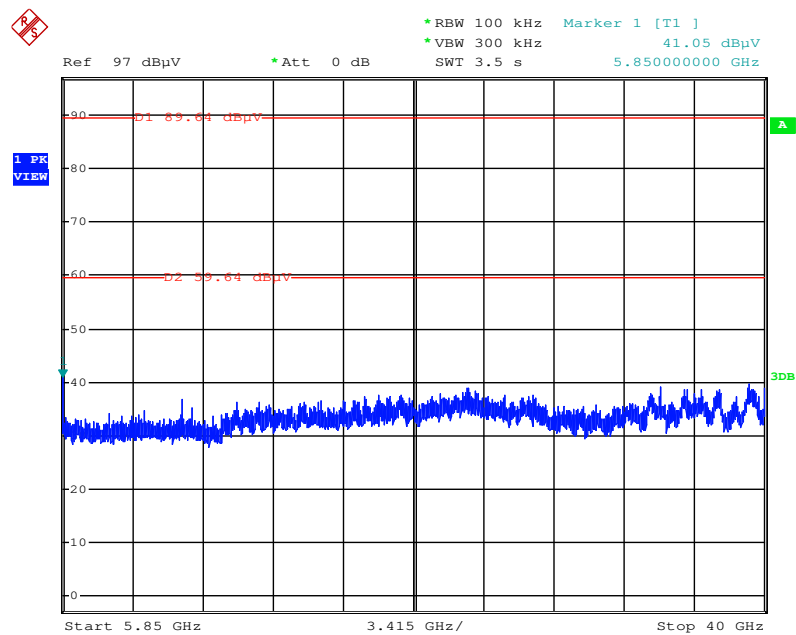
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Low Band Edge Plot on Configuration IEEE 802.11ac 20MHz Nss1MCS0 / CH 165 / Ant. 1+2+3



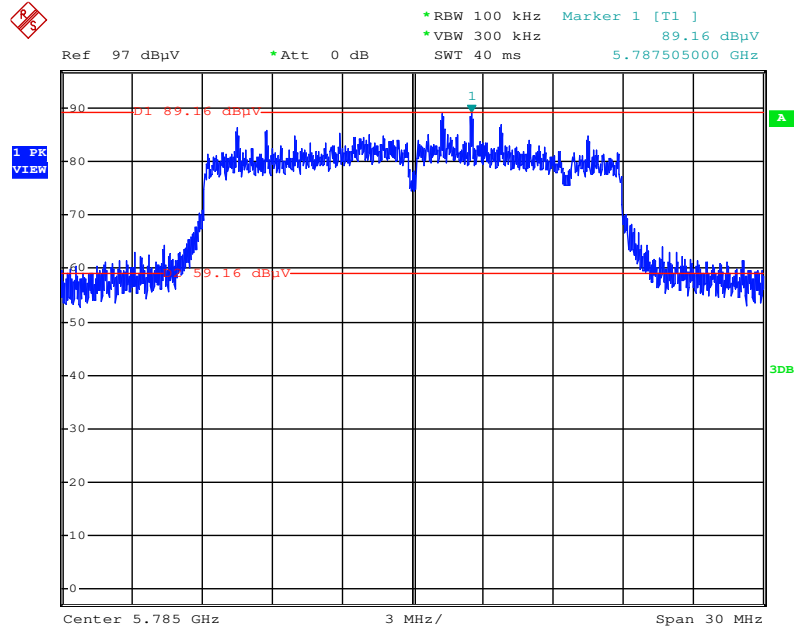
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Low Band Edge Plot on Configuration IEEE 802.11ac 20MHz Nss1MCS0 / CH 165 / Ant. 1+2+3



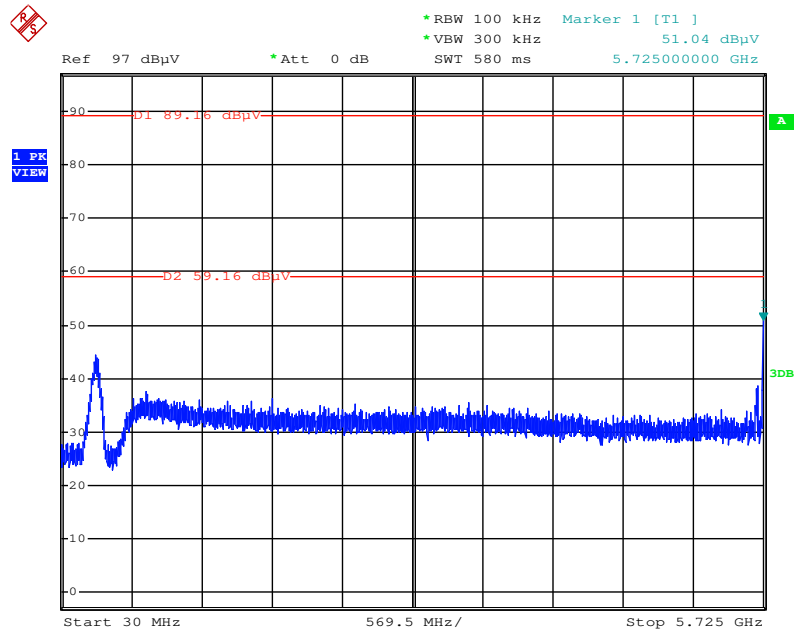
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Low Band Edge Plot on Configuration IEEE 802.11ac 20MHz Nss2MCS0 / Reference Level /
Ant. 1+2+3



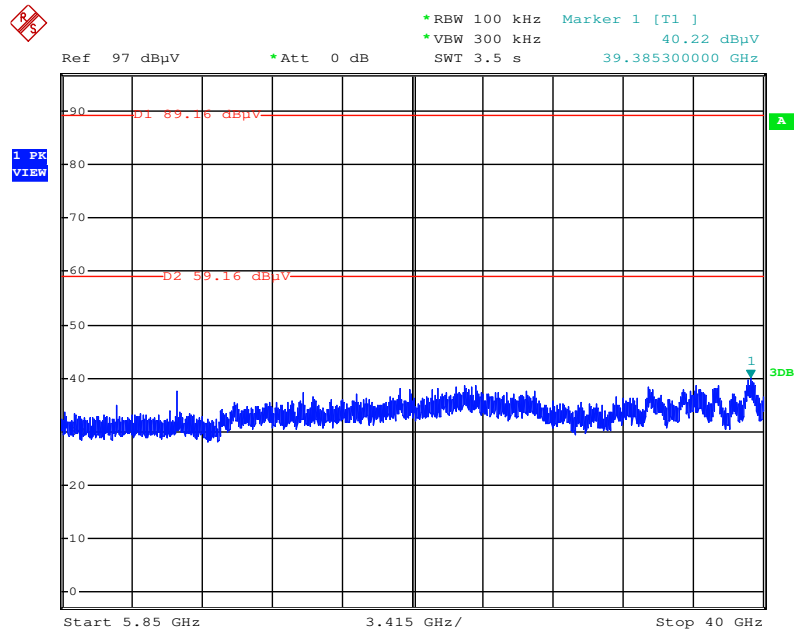
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Low Band Edge Plot on Configuration IEEE 802.11ac 20MHz Nss2MCS0 / CH 149 / Ant. 1+2+3



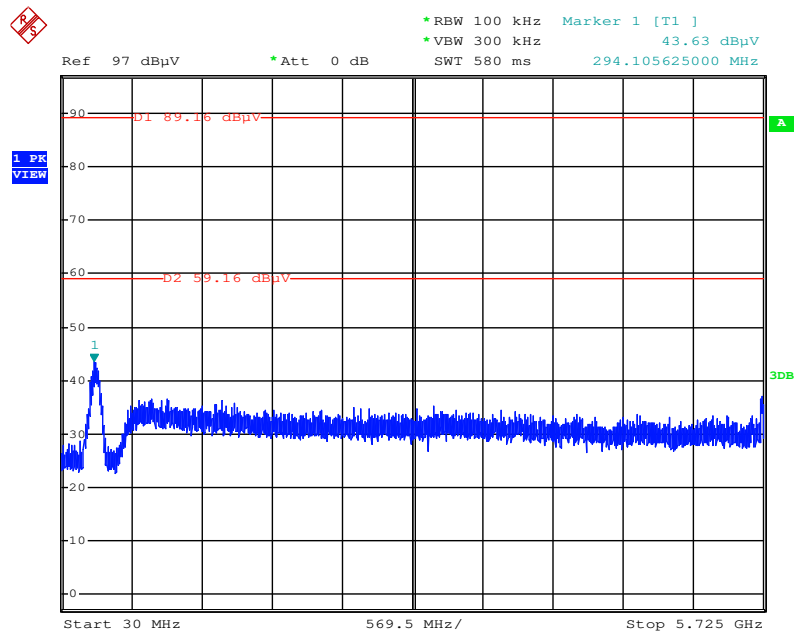
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Low Band Edge Plot on Configuration IEEE 802.11ac 20MHz Nss2MCS0 / CH 149 / Ant. 1+2+3



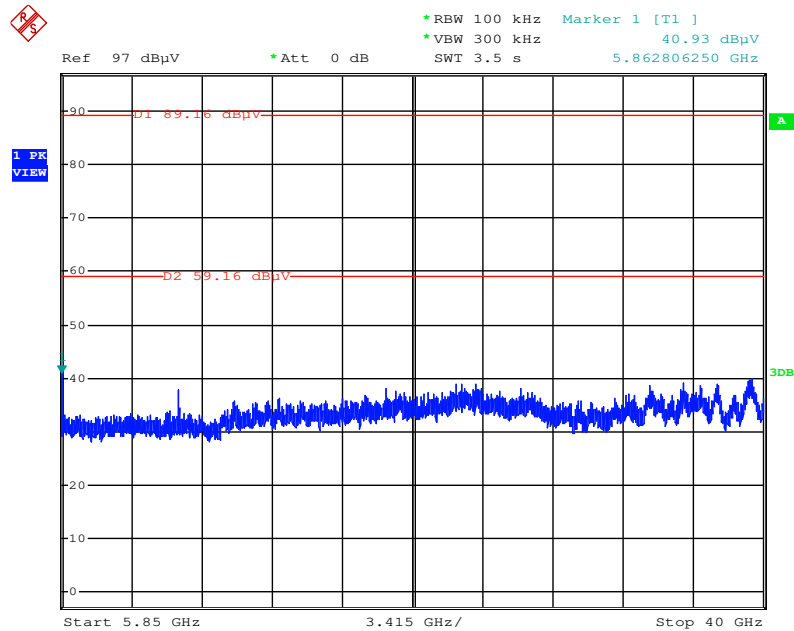
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Low Band Edge Plot on Configuration IEEE 802.11ac 20MHz Nss2MCS0 / CH 157 / Ant. 1+2+3



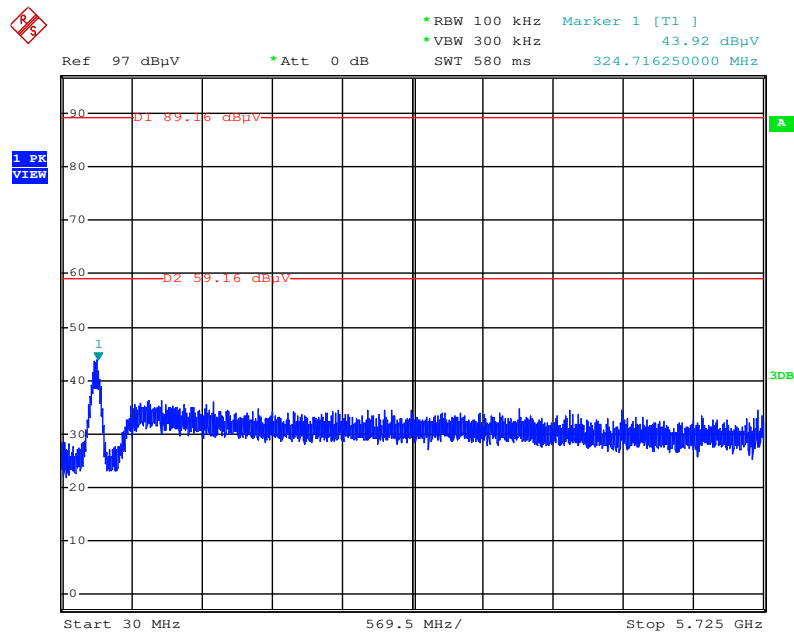
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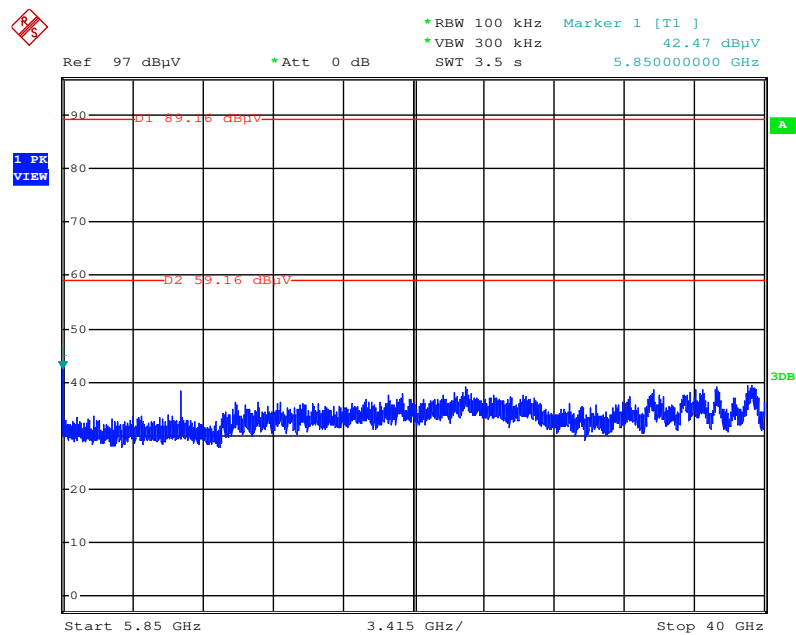
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Low Band Edge Plot on Configuration IEEE 802.11ac 20MHz Nss2MCS0 / CH 165 / Ant. 1+2+3



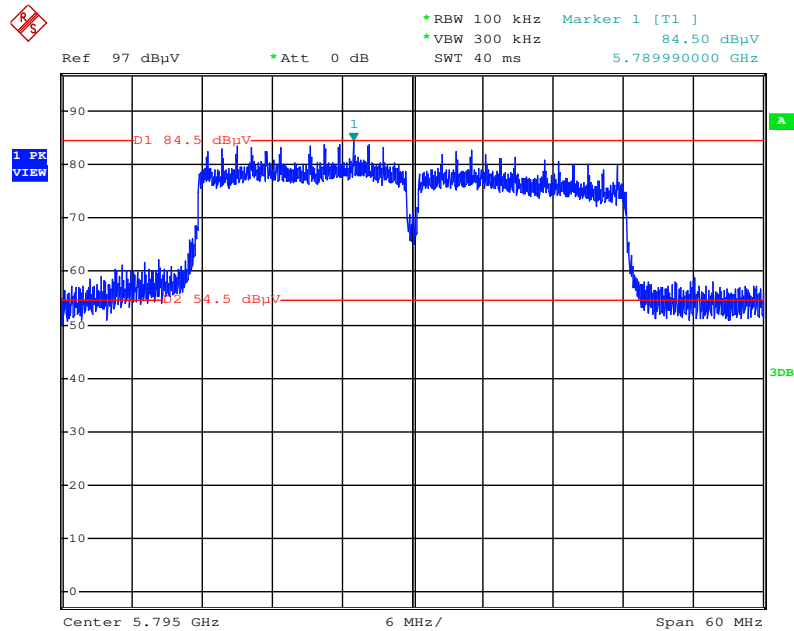
Date: 7.FEB.2014 21:40:18

Low Band Edge Plot on Configuration IEEE 802.11ac 20MHz Nss2MCS0 / CH 165 / Ant. 1+2+3



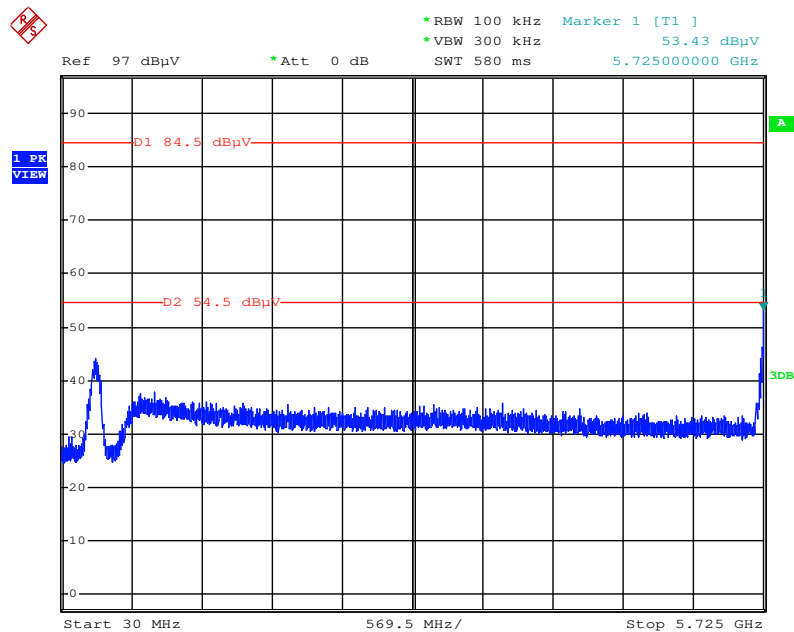
Date: 7.FEB.2014 21:39:50

Low Band Edge Plot on Configuration IEEE 802.11ac 40MHz / Reference Level / Ant. 1



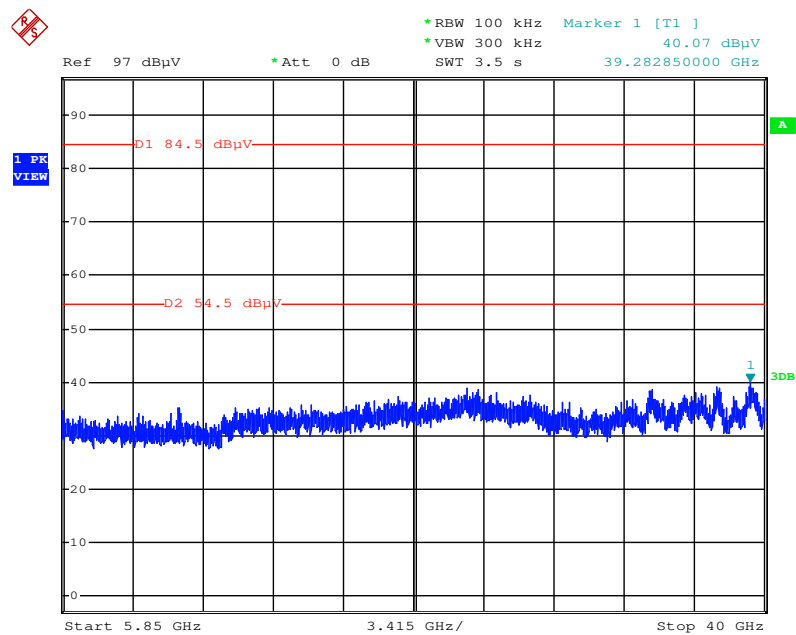
Date: 7.FEB.2014 20:12:06

Low Band Edge Plot on Configuration IEEE 802.11ac 40MHz Nss1MCS0 / CH 151 / Ant. 1



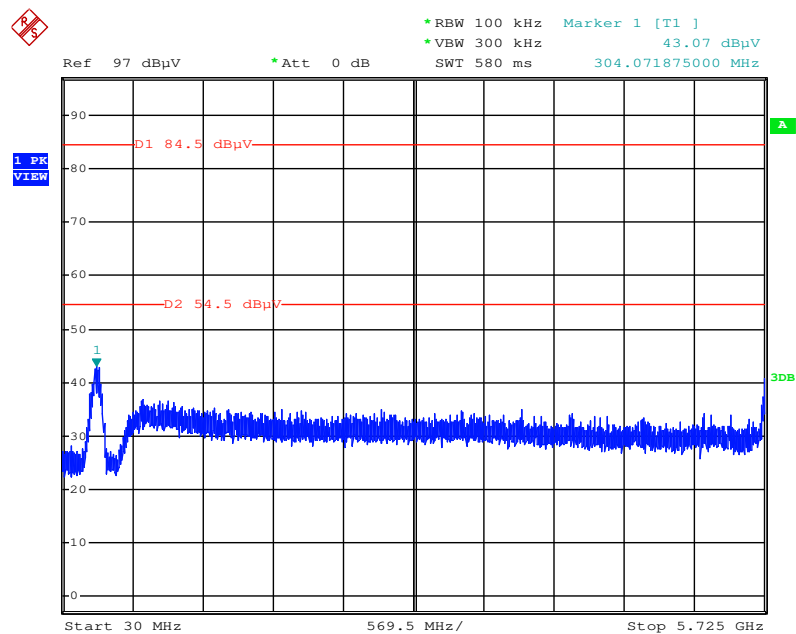
Date: 7.FEB.2014 20:29:11

Low Band Edge Plot on Configuration IEEE 802.11ac 40MHz Nss1MCS0 / CH 151 / Ant. 1



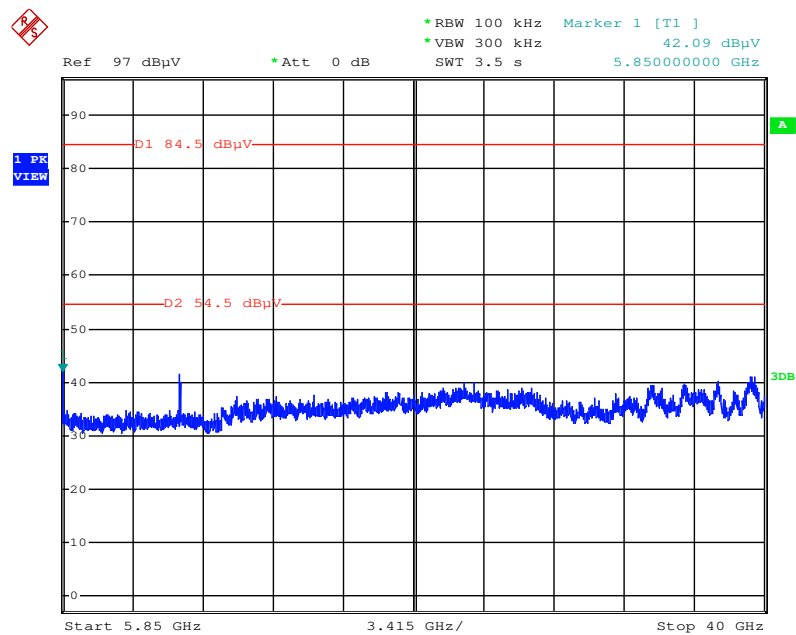
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Low Band Edge Plot on Configuration IEEE 802.11ac 40MHz Nss1MCS0 / CH 159 / Ant. 1



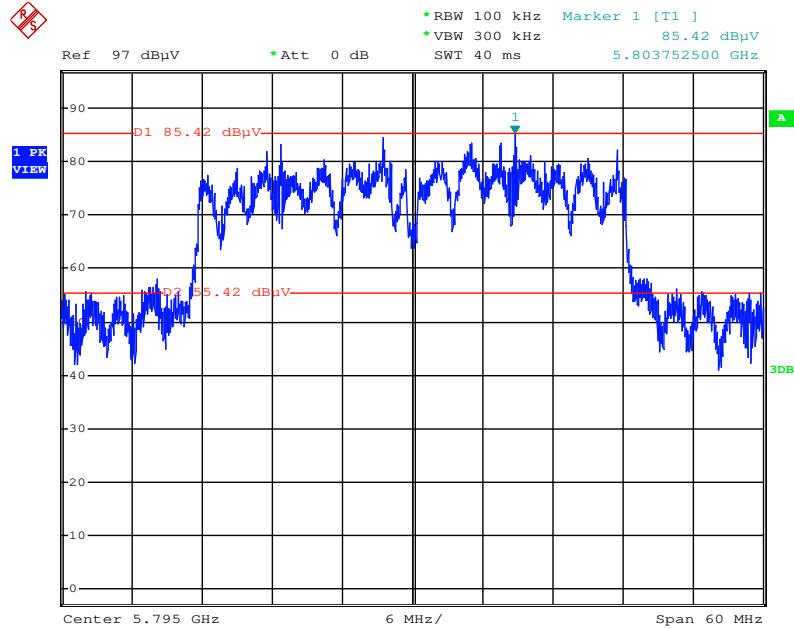
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Low Band Edge Plot on Configuration IEEE 802.11ac 40MHz Nss1MCS0 / CH 159 / Ant. 1



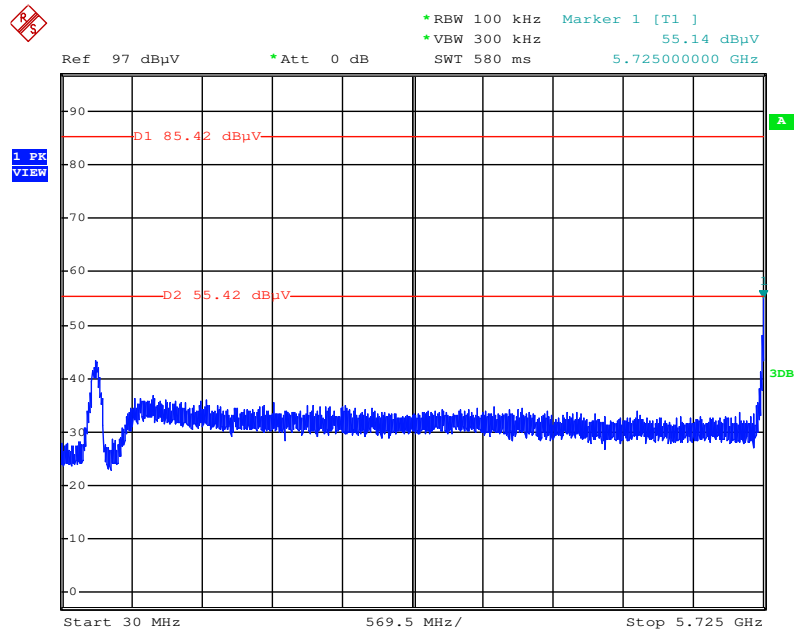
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Low Band Edge Plot on Configuration IEEE 802.11ac 40MHz Nss1MCS0 / Reference Level /
Ant. 1+2+3



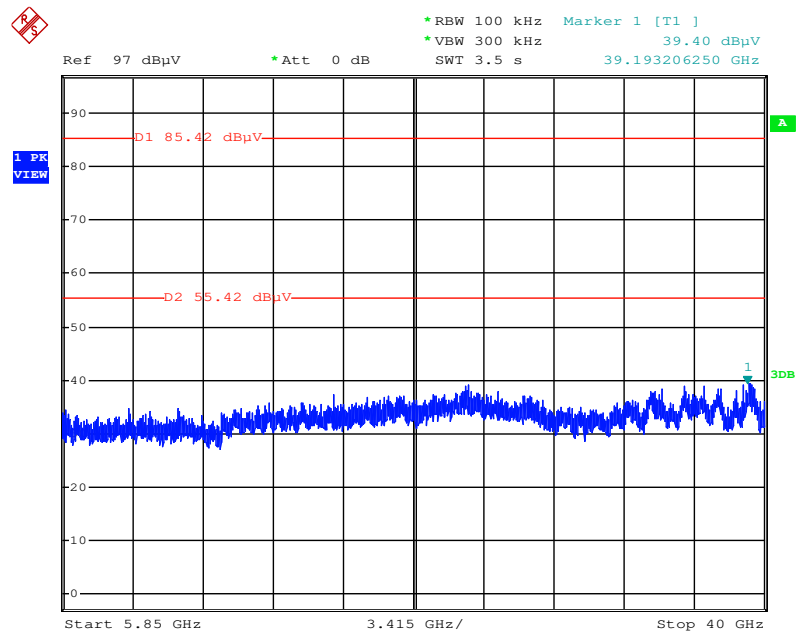
Date: 7.FEB.2014 18:47:19

Low Band Edge Plot on Configuration IEEE 802.11ac 40MHz Nss1MCS0 / CH 151 / Ant. 1+2+3



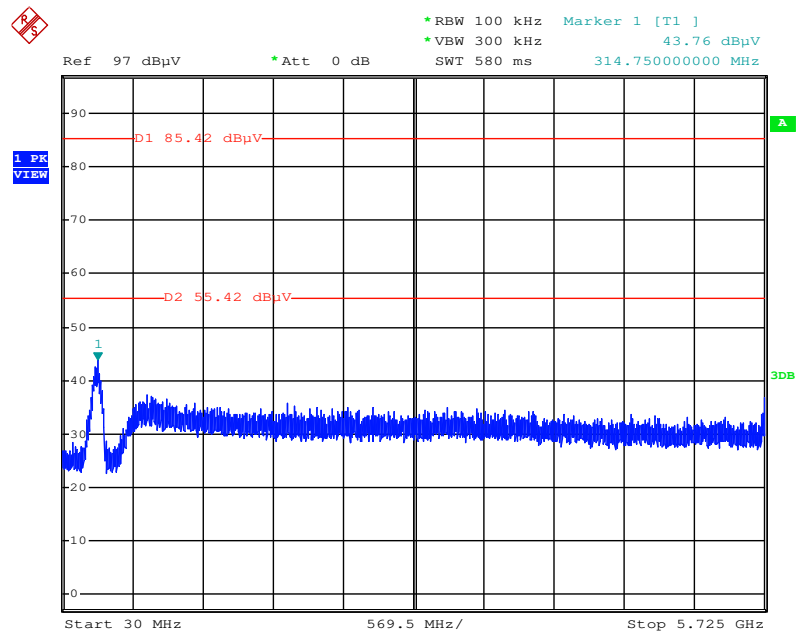
Date: 7.FEB.2014 19:01:36

Low Band Edge Plot on Configuration IEEE 802.11ac 40MHz Nss1MCS0 / CH 151 / Ant. 1+2+3



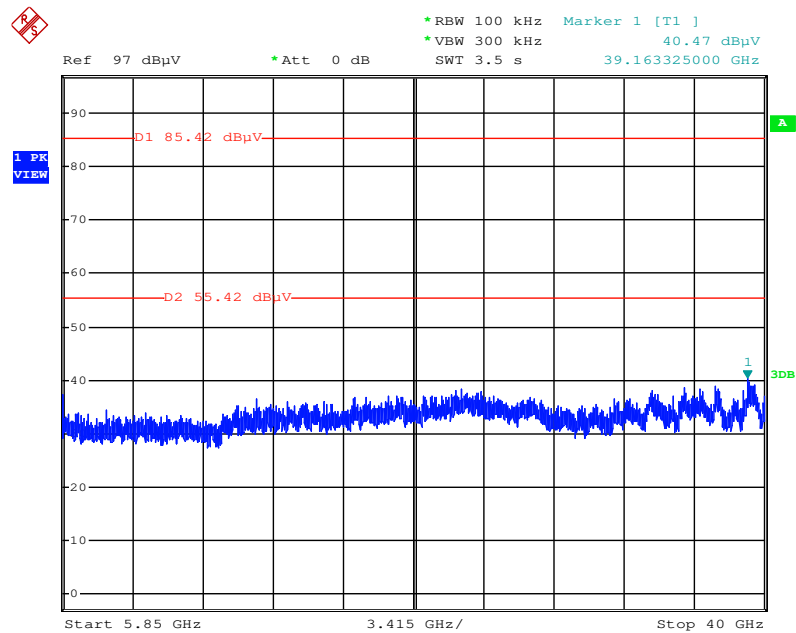
Date: 7.FEB.2014 19:02:10

Low Band Edge Plot on Configuration IEEE 802.11ac 40MHz Nss1MCS0 / CH 159 / Ant. 1+2+3



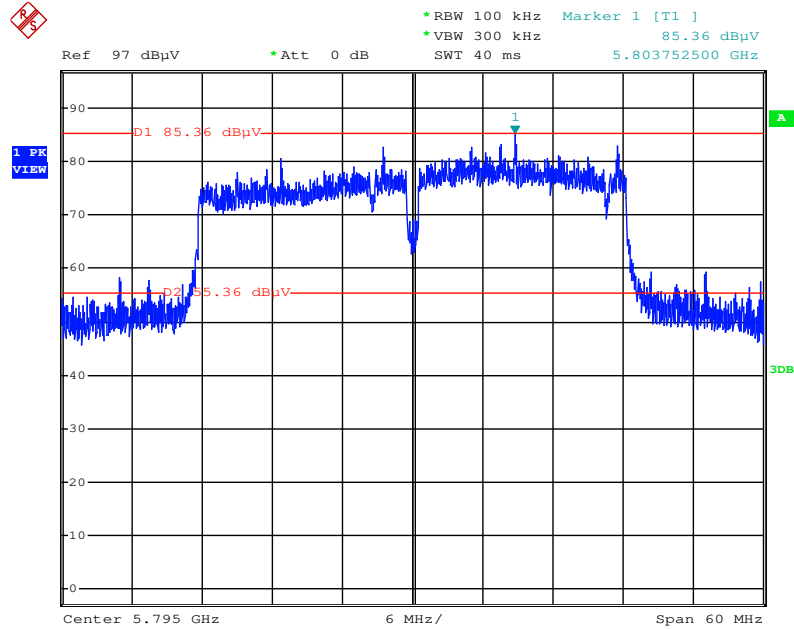
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Low Band Edge Plot on Configuration IEEE 802.11ac 40MHz Nss1MCS0 / CH 159 / Ant. 1+2+3



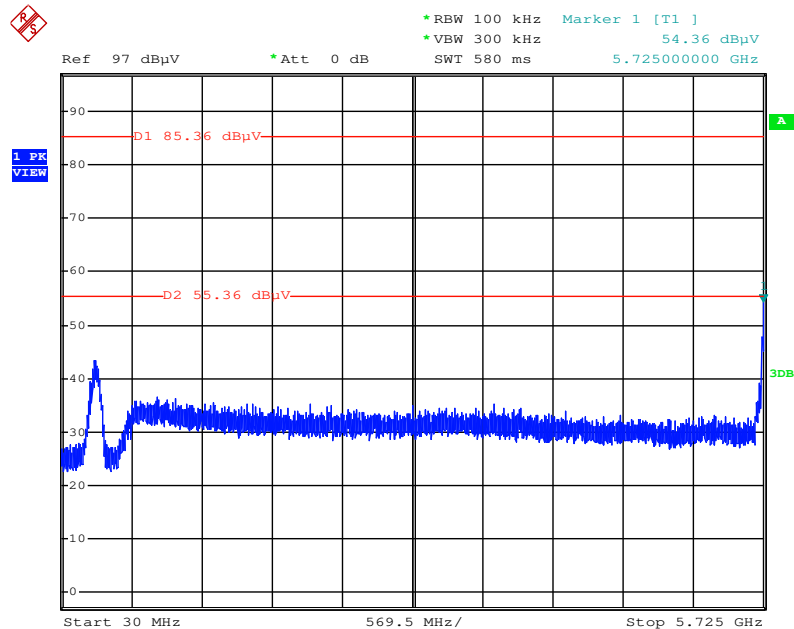
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Low Band Edge Plot on Configuration IEEE 802.11ac 40MHz Nss2MCS0 / Reference Level /
Ant. 1+2+3



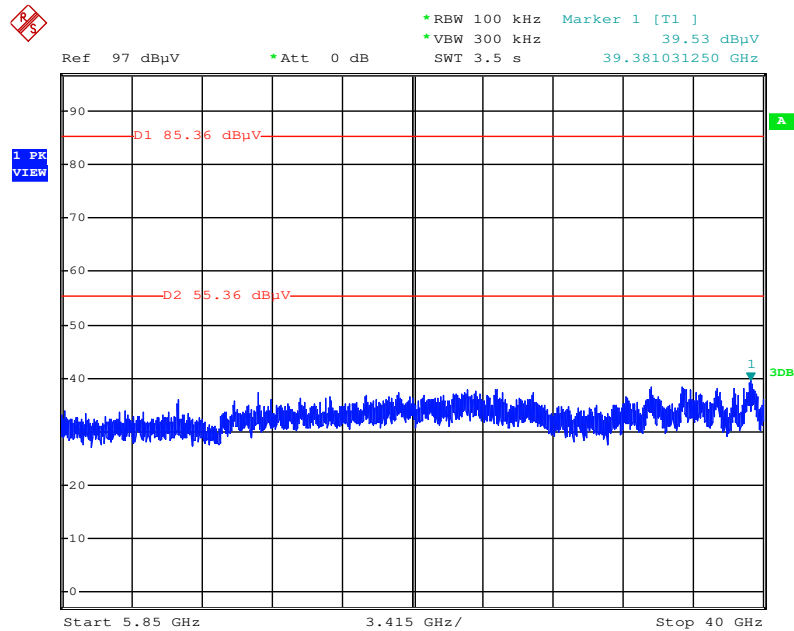
Date: 7.FEB.2014 19:05:00

Low Band Edge Plot on Configuration IEEE 802.11ac 40MHz Nss2MCS0 / CH 151 / Ant. 1+2+3



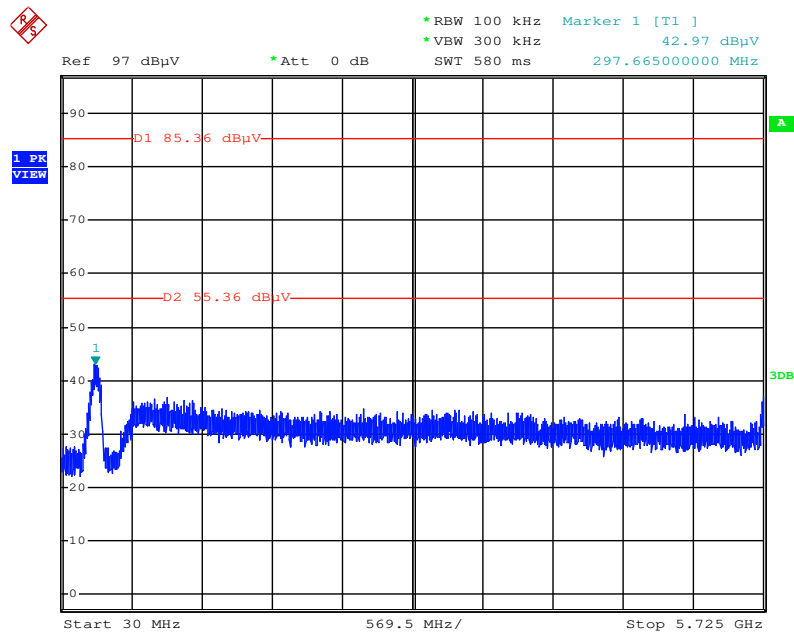
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Low Band Edge Plot on Configuration IEEE 802.11ac 40MHz Nss2MCS0 / CH 151 / Ant. 1+2+3



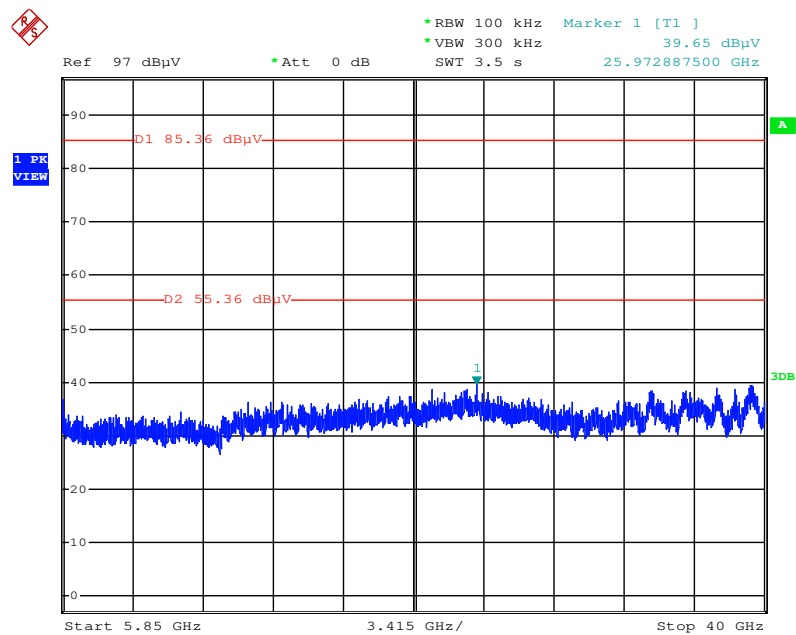
Date: 7.FEB.2014 19:14:44

Low Band Edge Plot on Configuration IEEE 802.11ac 40MHz Nss2MCS0 / CH 159 / Ant. 1+2+3



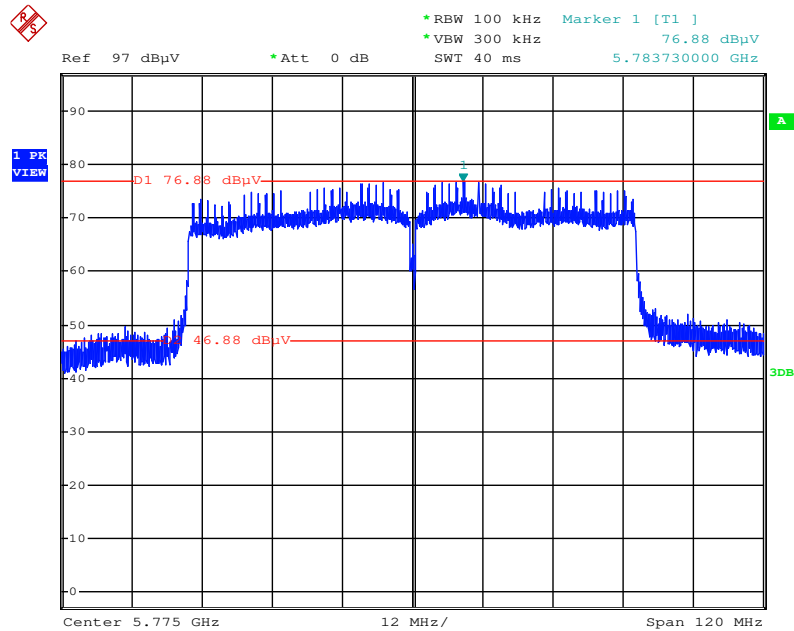
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Low Band Edge Plot on Configuration IEEE 802.11ac 40MHz Nss2MCS0 / CH 159 / Ant. 1+2+3



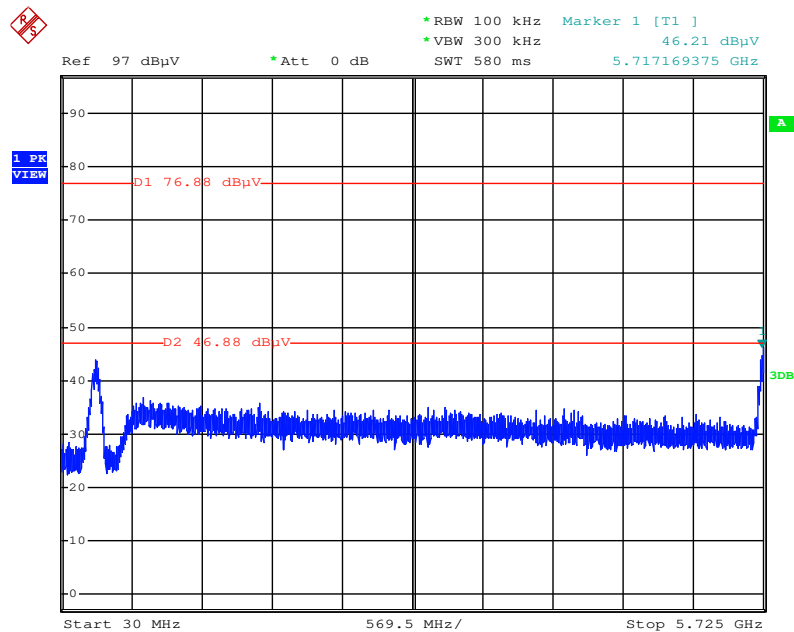
Date: 7.FEB.2014 19:05:56

Low Band Edge Plot on Configuration IEEE 802.11ac 80MHz / Reference Level / Ant. 3



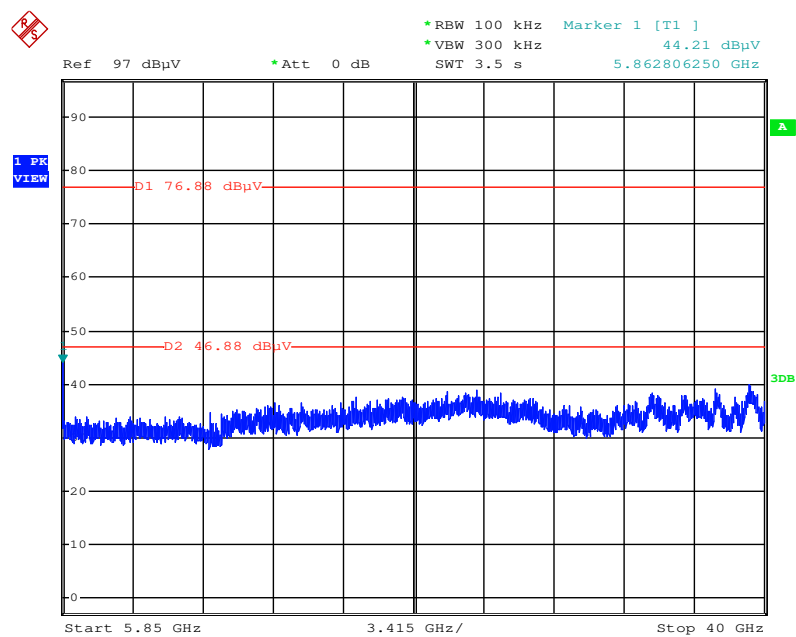
Date: 7.FEB.2014 18:40:45

Low Band Edge Plot on Configuration IEEE 802.11ac 80MHz Nss1MCS0 / CH 155 / Ant. 3



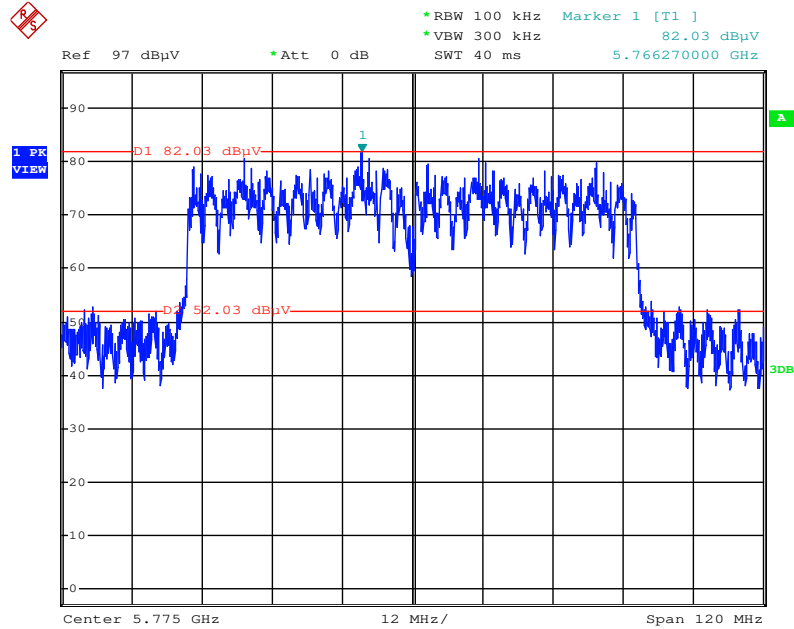
Date: 7.FEB.2014 18:41:11

Low Band Edge Plot on Configuration IEEE 802.11ac 80MHz Nss1MCS0 / CH 155 / Ant. 3



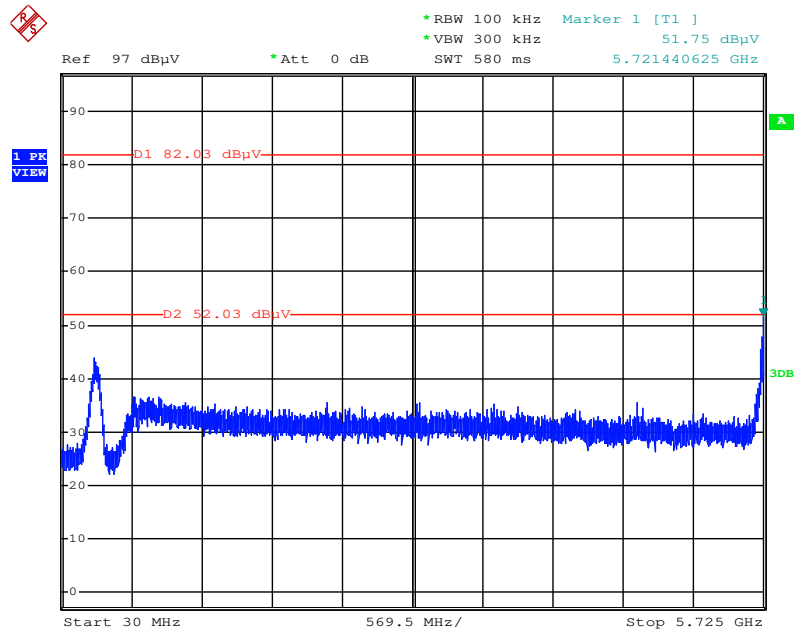
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Low Band Edge Plot on Configuration IEEE 802.11ac 80MHz Nss1MCS0 / Reference Level /
Ant. 1+2+3



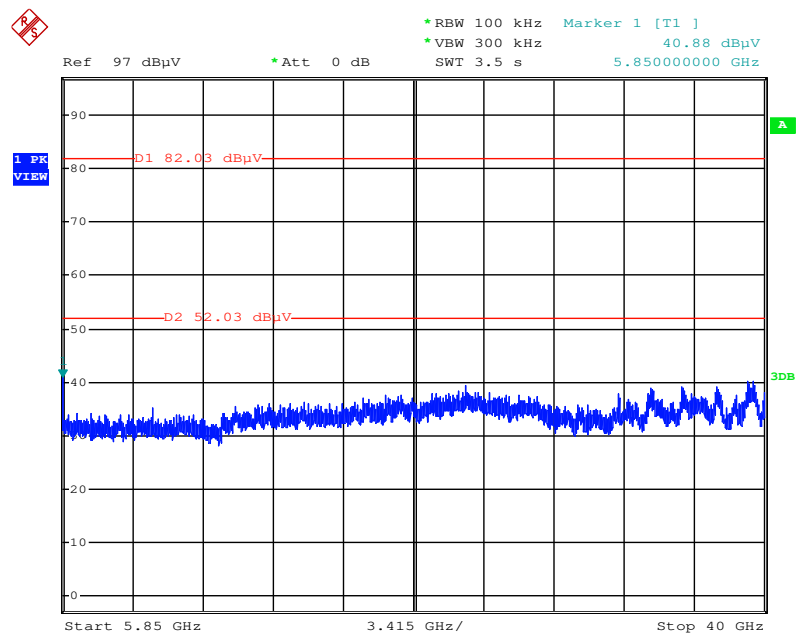
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Low Band Edge Plot on Configuration IEEE 802.11ac 80MHz Nss1MCS0 / CH 155 / Ant. 1+2+3



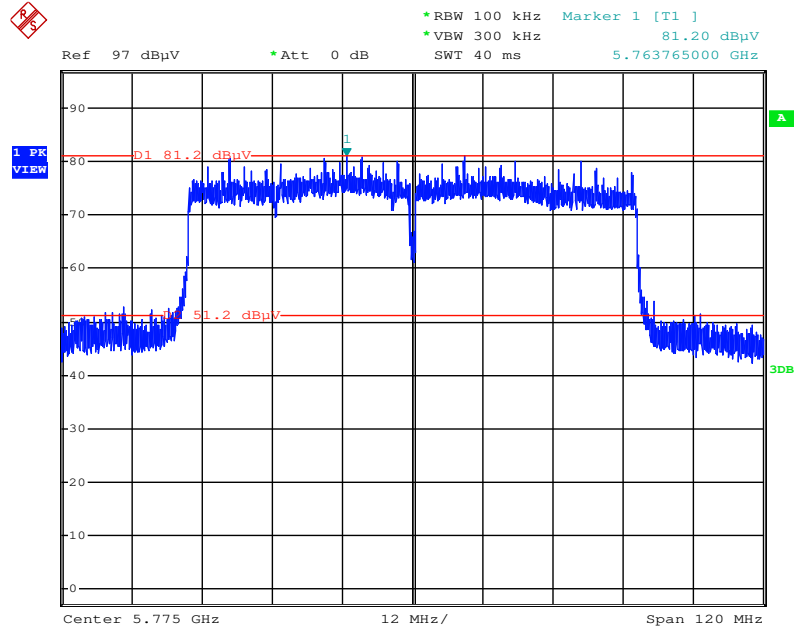
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Low Band Edge Plot on Configuration IEEE 802.11ac 80MHz Nss1MCS0 / CH 155 / Ant. 1+2+3



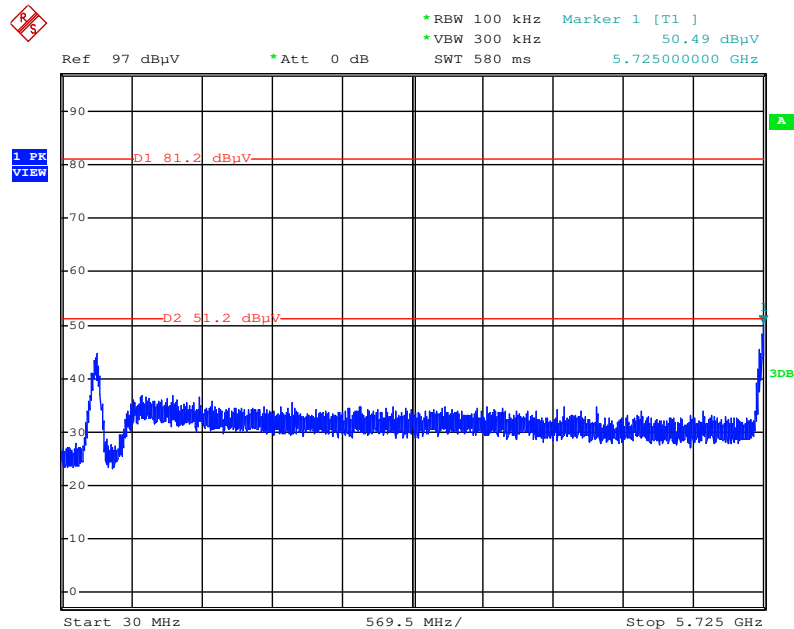
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Low Band Edge Plot on Configuration IEEE 802.11ac 80MHz Nss2MCS0 / Reference Level /
Ant. 1+2+3



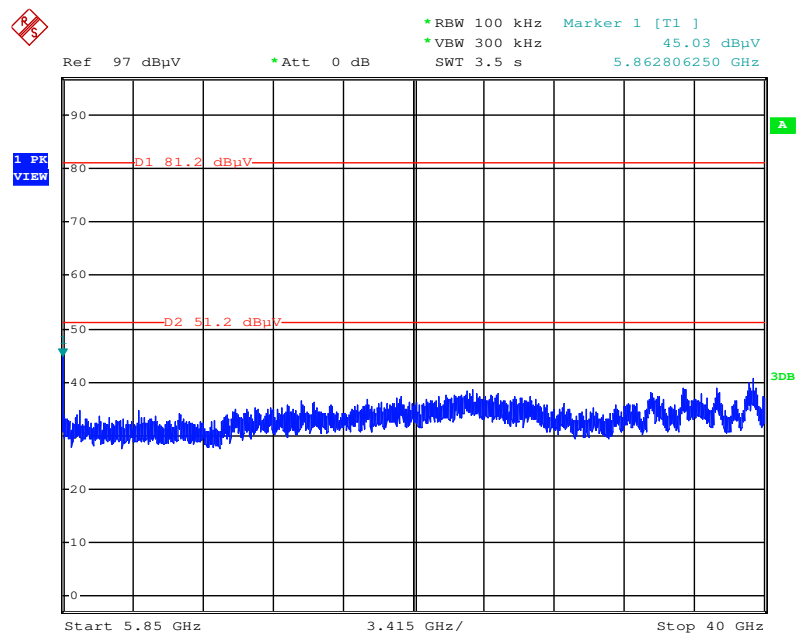
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Low Band Edge Plot on Configuration IEEE 802.11ac 80MHz Nss2MCS0 / CH 155 / Ant. 1+2+3



Date: 7.FEB.2014 18:04:25

Low Band Edge Plot on Configuration IEEE 802.11ac 80MHz Nss2MCS0 / CH 155 / Ant. 1+2+3

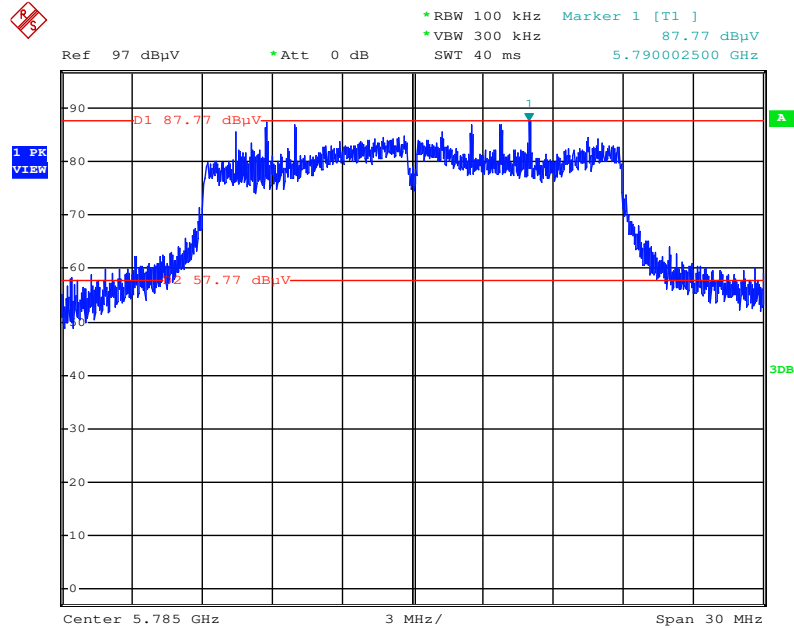


Date: 7.FEB.2014 18:05:00

For Beamforming

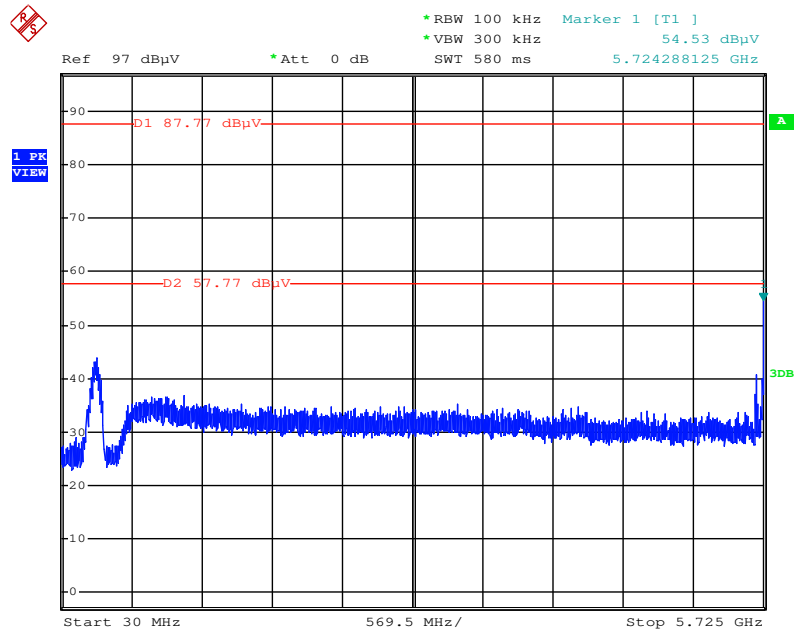
Low Band Edge Plot on Configuration IEEE 802.11ac 20MHz Nss1MCS0 / Reference Level /

Ant. 1+2+3



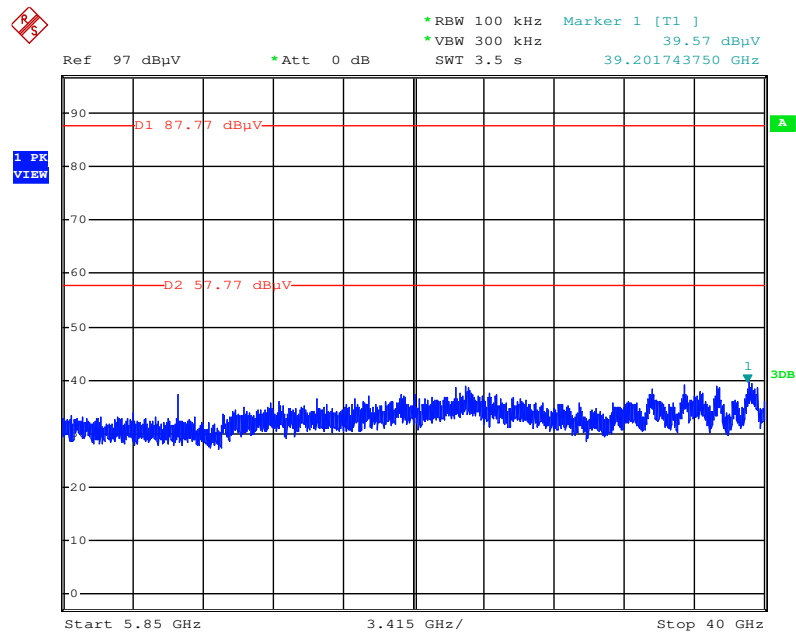
Date: 10.FEB.2014 15:29:27

Low Band Edge Plot on Configuration IEEE 802.11ac 20MHz Nss1MCS0 / CH 149 / Ant. 1+2+3



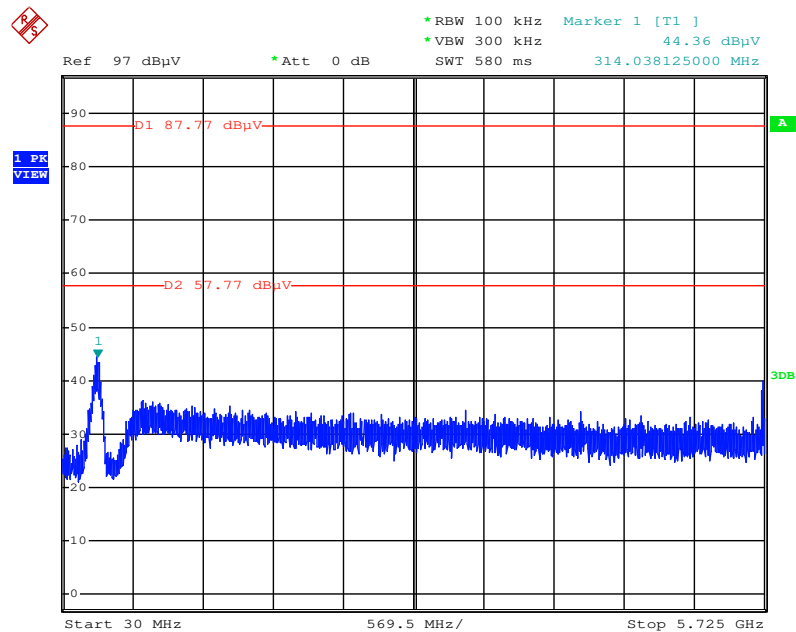
Date: 10.FEB.2014 15:30:57

Low Band Edge Plot on Configuration IEEE 802.11ac 20MHz Nss1MCS0 / CH 149 / Ant. 1+2+3



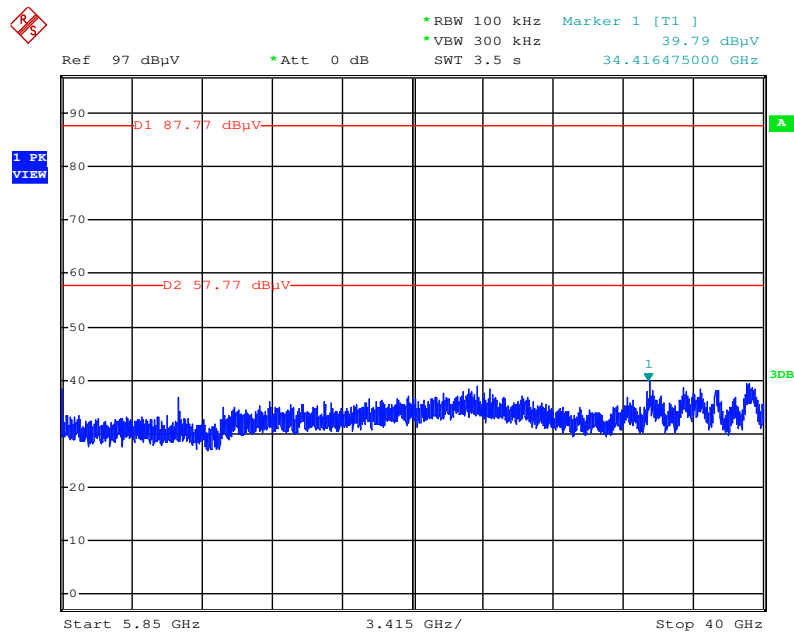
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Low Band Edge Plot on Configuration IEEE 802.11ac 20MHz Nss1MCS0 / CH 157 / Ant. 1+2+3



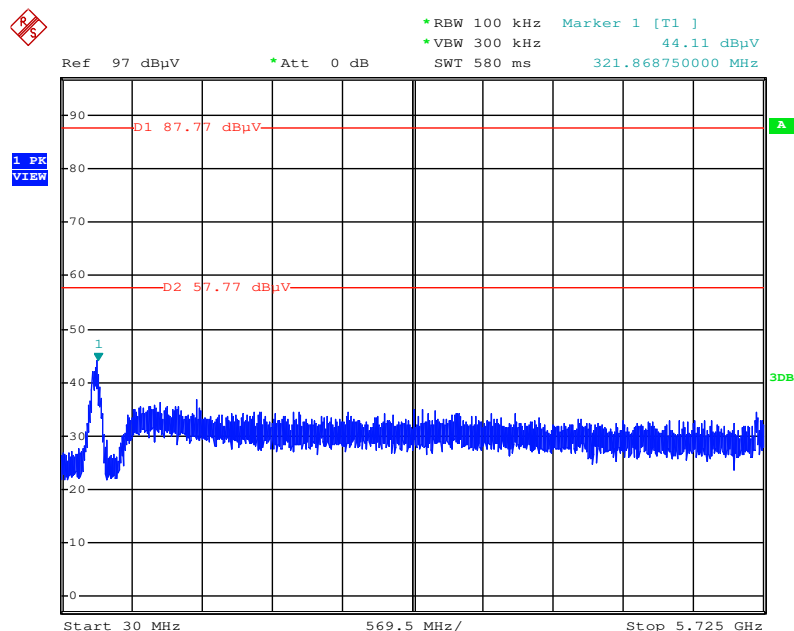
Date: 10.FEB.2014 15:29:44

Low Band Edge Plot on Configuration IEEE 802.11ac 20MHz Nss1MCS0 / CH 157 / Ant. 1+2+3



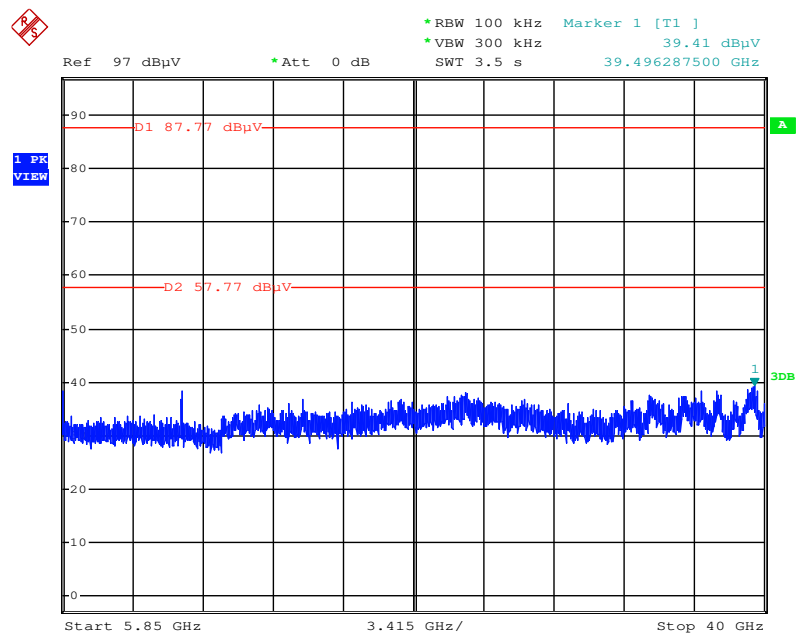
Date: 10.FEB.2014 15:30:05

Low Band Edge Plot on Configuration IEEE 802.11ac 20MHz Nss1MCS0 / CH 165 / Ant. 1+2+3



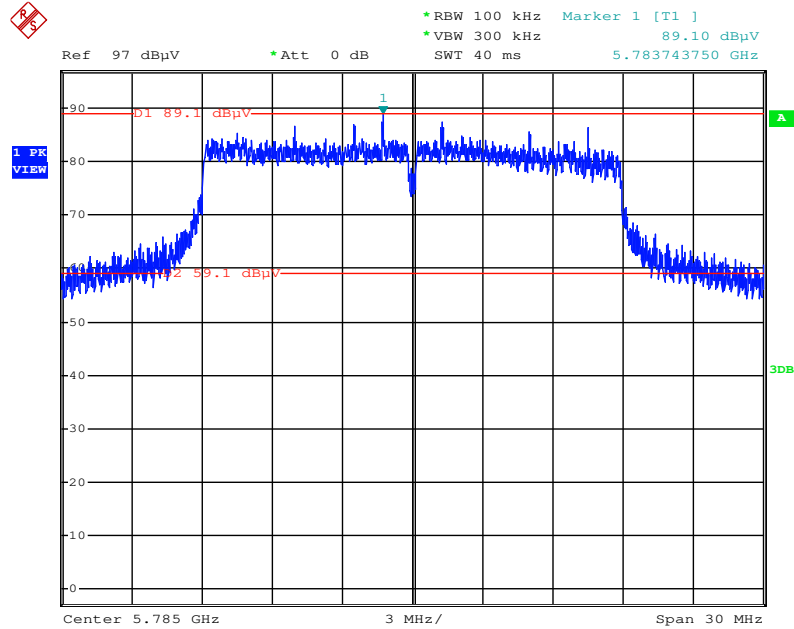
Date: 10.FEB.2014 15:32:13

Low Band Edge Plot on Configuration IEEE 802.11ac 20MHz Nss1MCS0 / CH 165 / Ant. 1+2+3



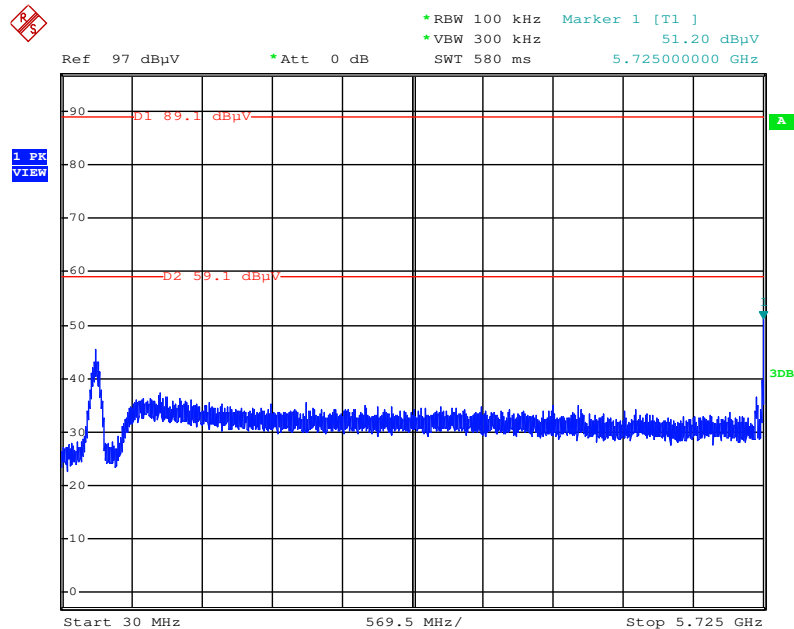
Date: 10.FEB.2014 15:32:37

Low Band Edge Plot on Configuration IEEE 802.11ac 20MHz Nss2MCS0 / Reference Level /
Ant. 1+2+3



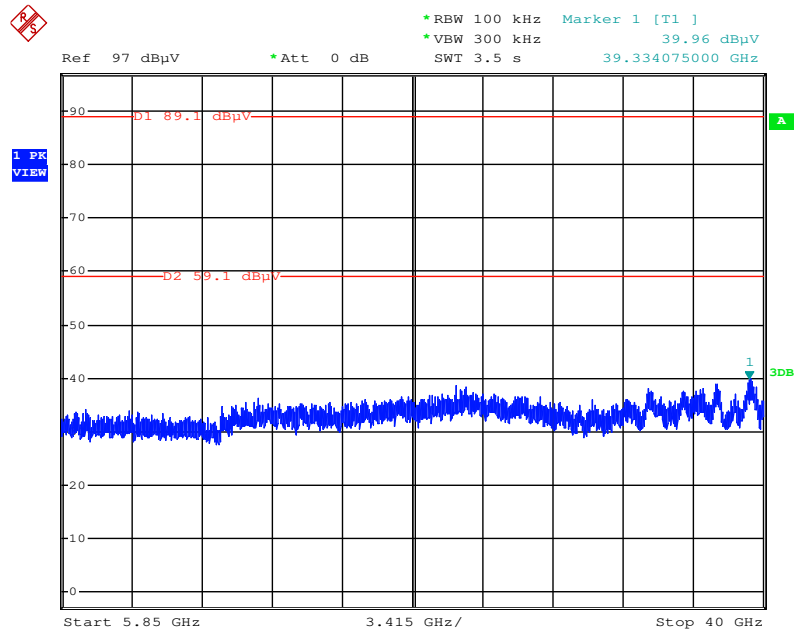
Date: 10.FEB.2014 15:39:02

Low Band Edge Plot on Configuration IEEE 802.11ac 20MHz Nss2MCS0 / CH 149 / Ant. 1+2+3



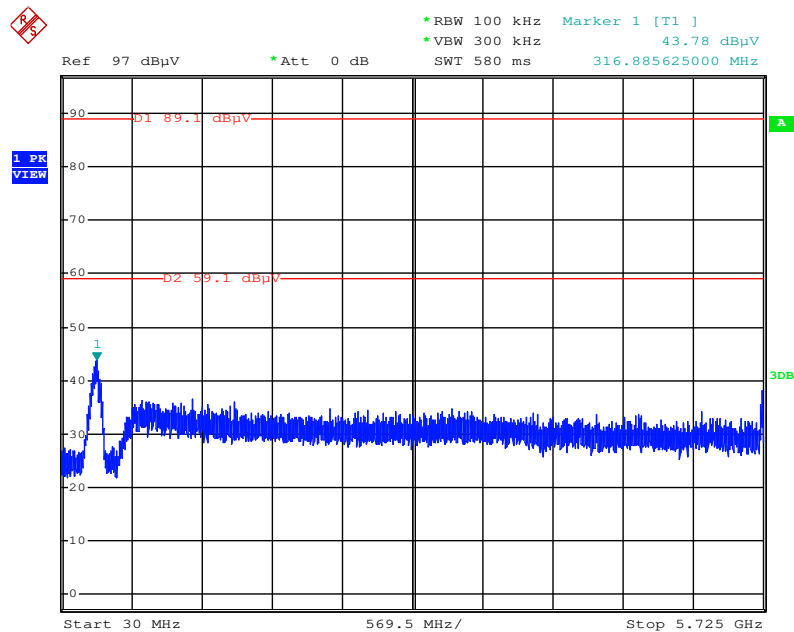
Date: 10.FEB.2014 15:41:12

Low Band Edge Plot on Configuration IEEE 802.11ac 20MHz Nss2MCS0 / CH 149 / Ant. 1+2+3



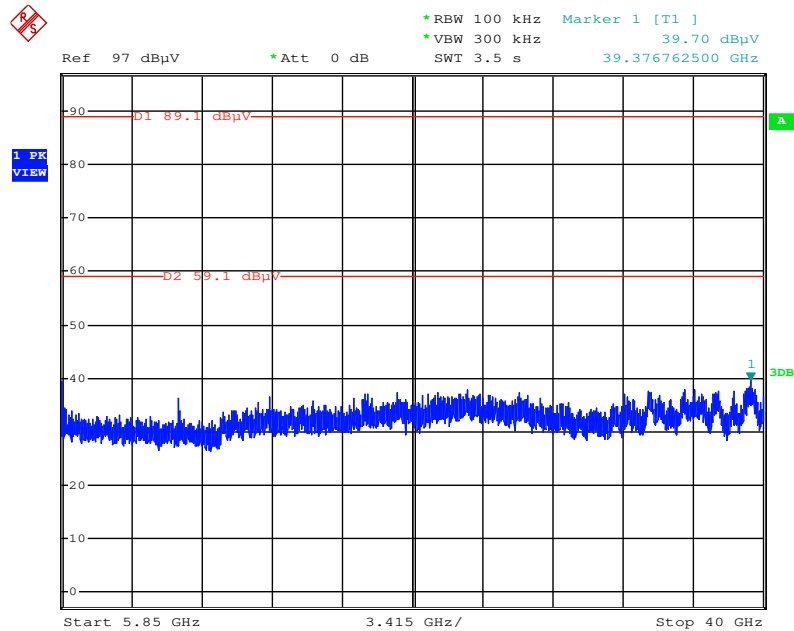
Date: 10.FEB.2014 15:41:39

Low Band Edge Plot on Configuration IEEE 802.11ac 20MHz Nss2MCS0 / CH 157 / Ant. 1+2+3



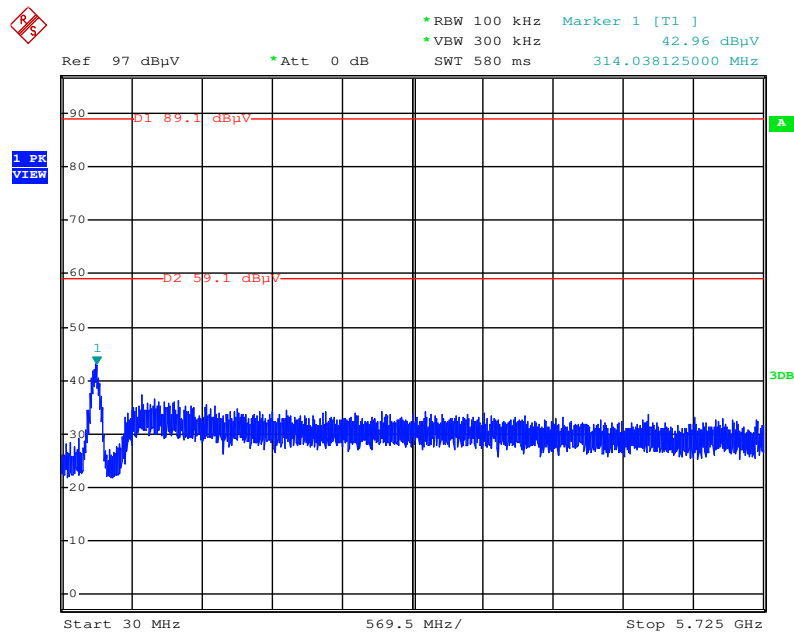
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Low Band Edge Plot on Configuration IEEE 802.11ac 20MHz Nss2MCS0 / CH 157 / Ant. 1+2+3



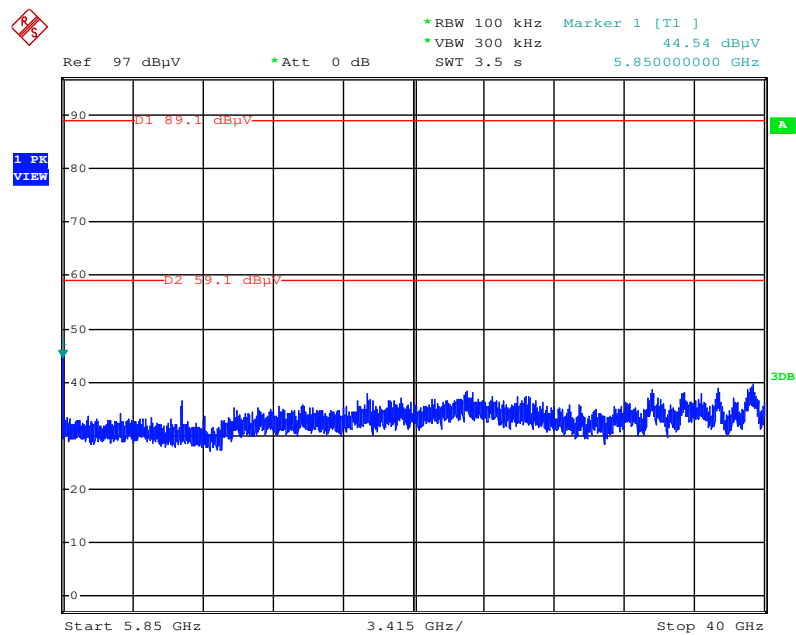
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Low Band Edge Plot on Configuration IEEE 802.11ac 20MHz Nss2MCS0 / CH 165 / Ant. 1+2+3



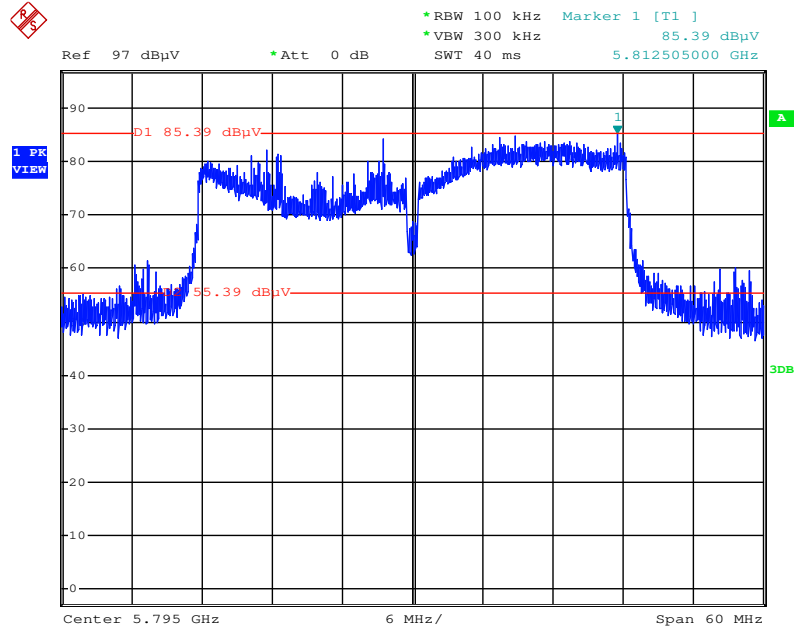
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Low Band Edge Plot on Configuration IEEE 802.11ac 20MHz Nss2MCS0 / CH 165 / Ant. 1+2+3



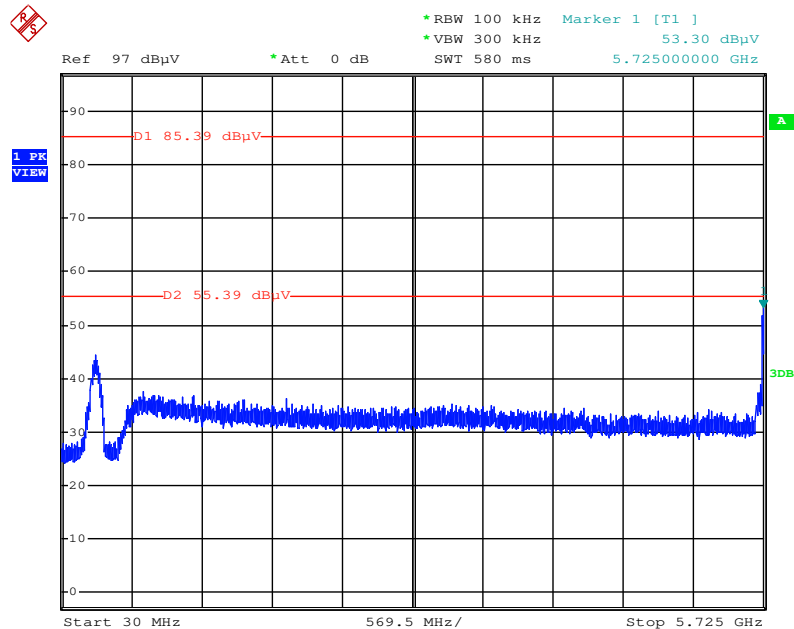
Date: 10.FEB.2014 15:43:44

Low Band Edge Plot on Configuration IEEE 802.11ac 40MHz Nss1MCS0 / Reference Level /
Ant. 1+2+3



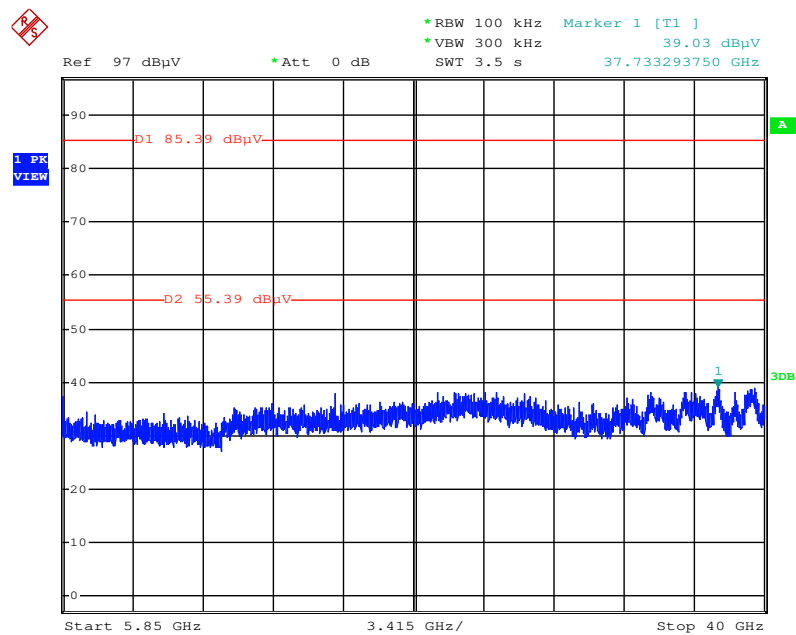
Date: 10.FEB.2014 15:15:19

Low Band Edge Plot on Configuration IEEE 802.11ac 40MHz Nss1MCS0 / CH 151 / Ant. 1+2+3



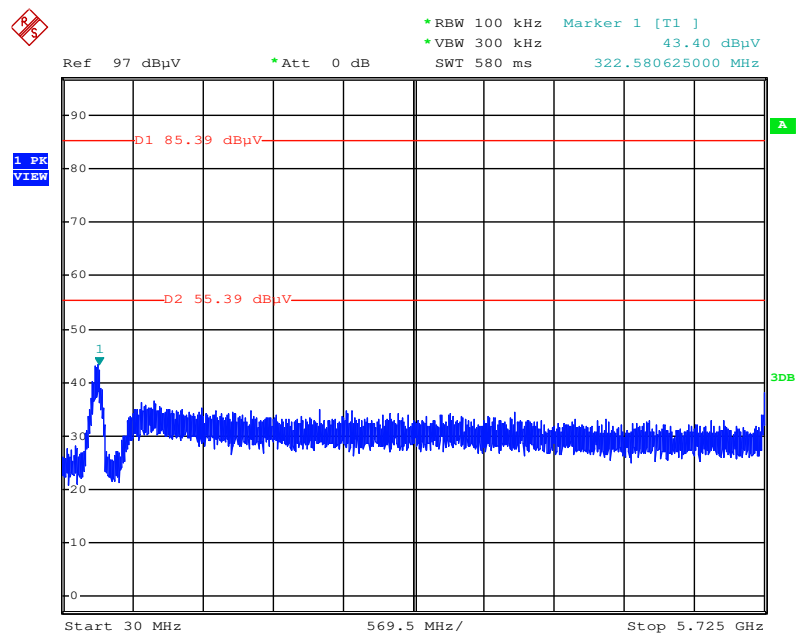
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Low Band Edge Plot on Configuration IEEE 802.11ac 40MHz Nss1MCS0 / CH 151 / Ant. 1+2+3



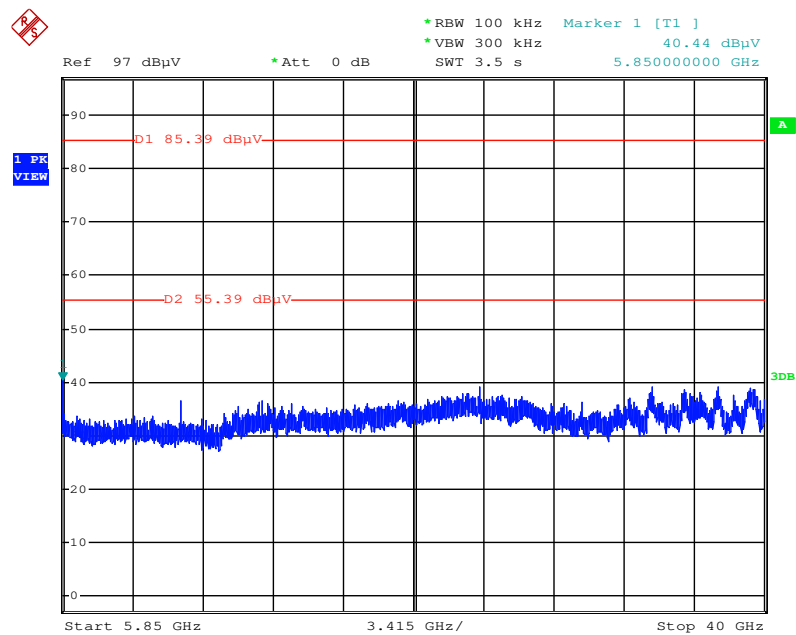
Date: 10.FEB.2014 15:17:47

Low Band Edge Plot on Configuration IEEE 802.11ac 40MHz Nss1MCS0 / CH 159 / Ant. 1+2+3



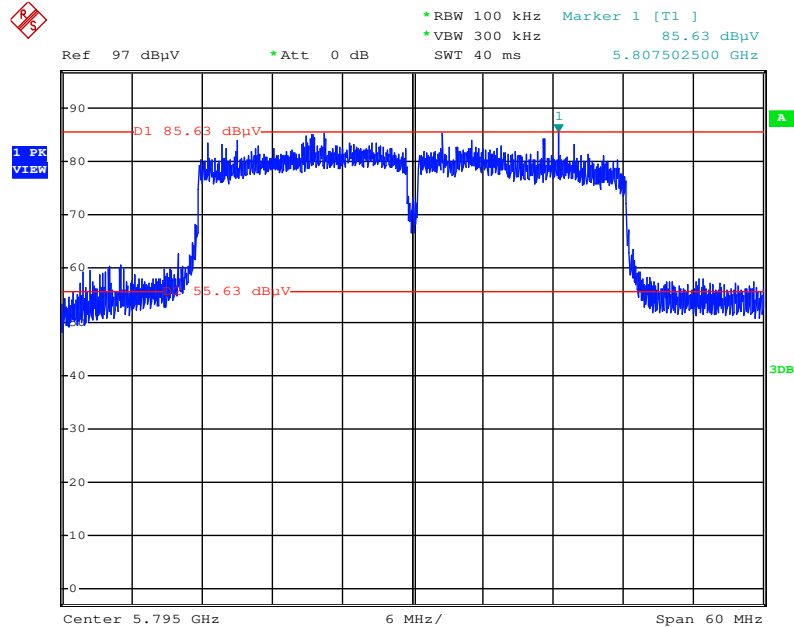
Date: 10.FEB.2014 15:15:42

Low Band Edge Plot on Configuration IEEE 802.11ac 40MHz Nss1MCS0 / CH 159 / Ant. 1+2+3



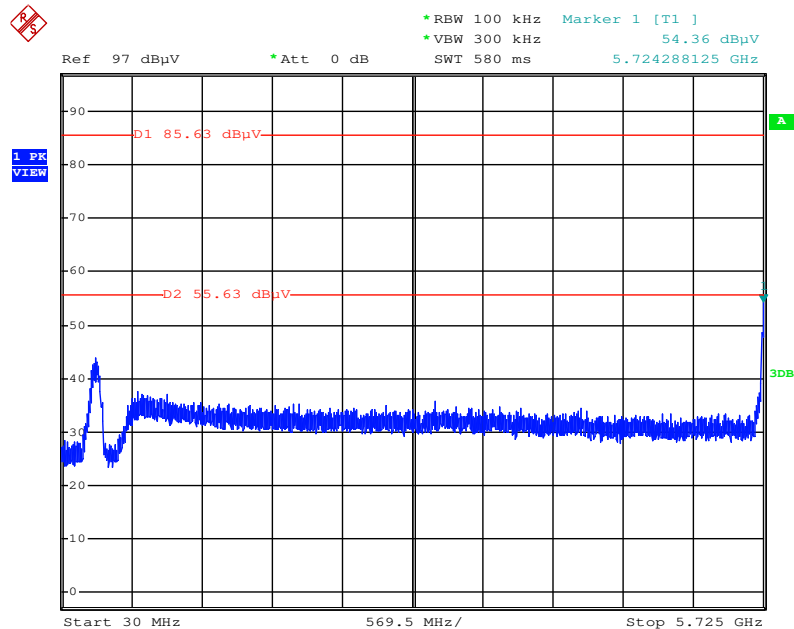
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Low Band Edge Plot on Configuration IEEE 802.11ac 40MHz Nss2MCS0 / Reference Level /
Ant. 1+2+3



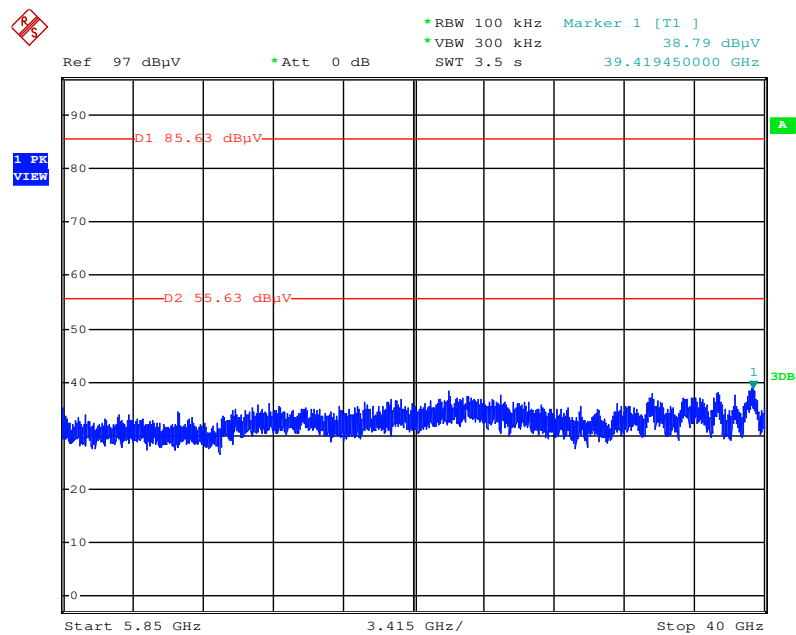
Date: 10.FEB.2014 15:23:17

Low Band Edge Plot on Configuration IEEE 802.11ac 40MHz Nss2MCS0 / CH 151 / Ant. 1+2+3



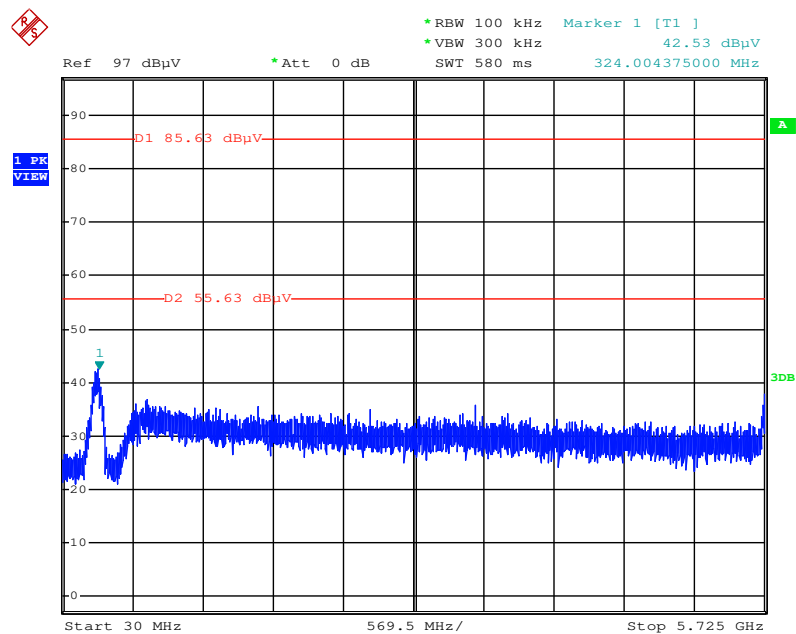
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Low Band Edge Plot on Configuration IEEE 802.11ac 40MHz Nss2MCS0 / CH 151 / Ant. 1+2+3



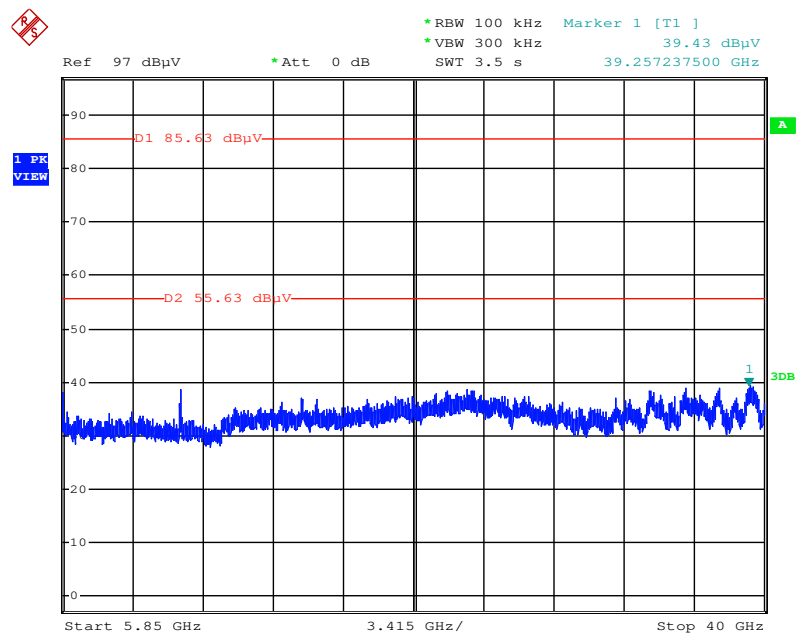
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Low Band Edge Plot on Configuration IEEE 802.11ac 40MHz Nss2MCS0 / CH 159 / Ant. 1+2+3



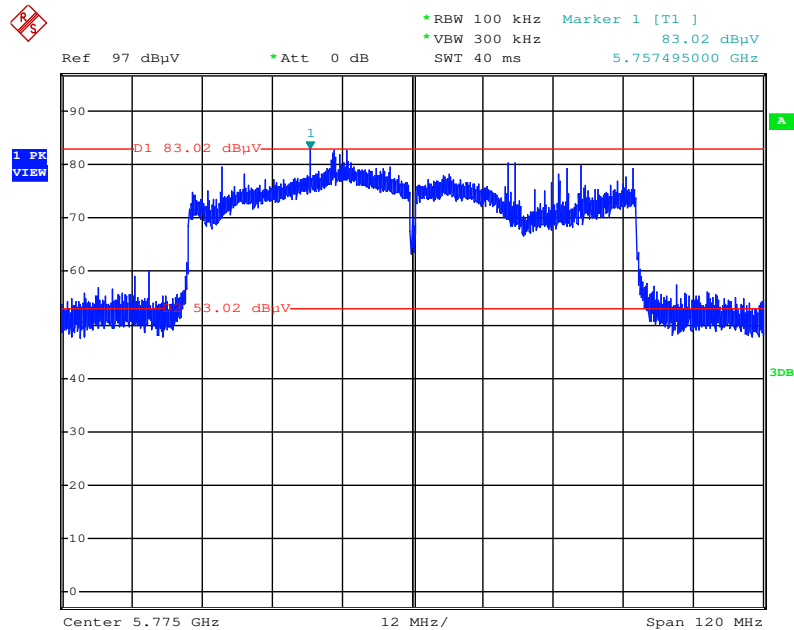
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Low Band Edge Plot on Configuration IEEE 802.11ac 40MHz Nss2MCS0 / CH 159 / Ant. 1+2+3



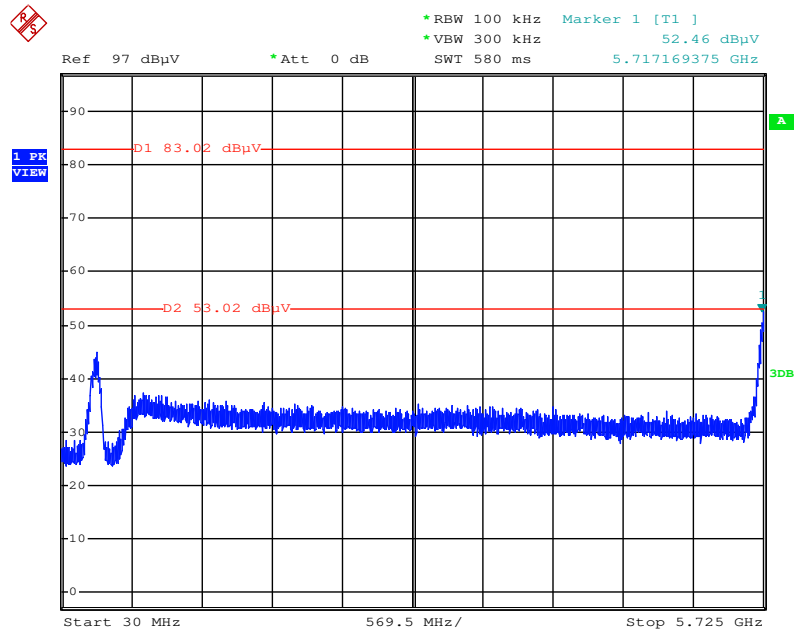
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Low Band Edge Plot on Configuration IEEE 802.11ac 80MHz Nss1MCS0 / Reference Level /
Ant. 1+2+3



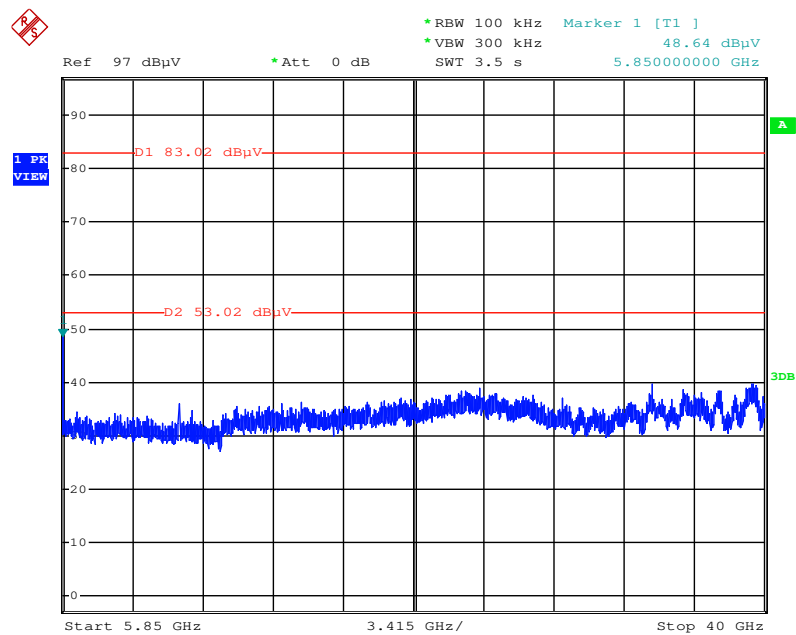
Date: 10.FEB.2014 15:10:13

Low Band Edge Plot on Configuration IEEE 802.11ac 80MHz Nss1MCS0 / CH 155 / Ant. 1+2+3



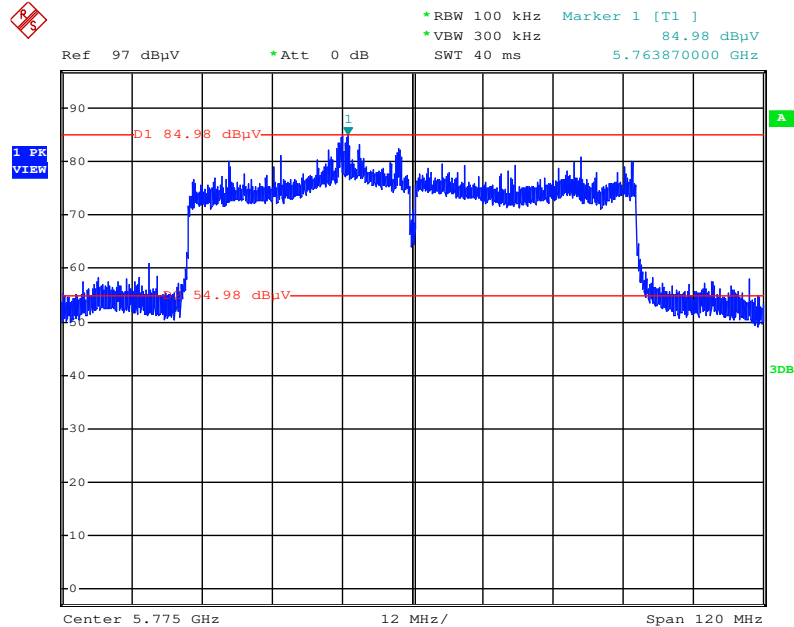
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Low Band Edge Plot on Configuration IEEE 802.11ac 80MHz Nss1MCS0 / CH 155 / Ant. 1+2+3



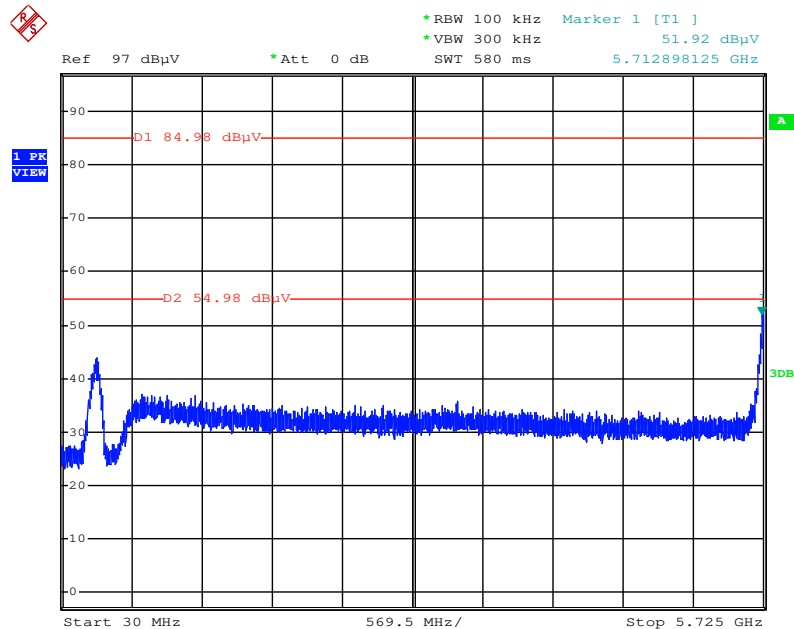
Date: 10.FEB.2014 15:11:44

Low Band Edge Plot on Configuration IEEE 802.11ac 80MHz Nss2MCS0 / Reference Level /
Ant. 1+2+3



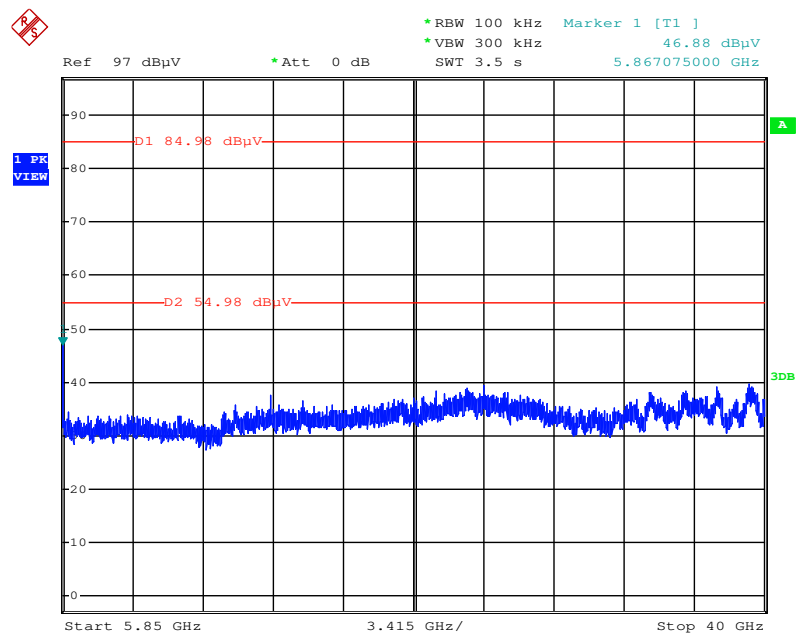
Date: 10.FEB.2014 14:59:40

Low Band Edge Plot on Configuration IEEE 802.11ac 80MHz Nss2MCS0 / CH 155 / Ant. 1+2+3



Date: 10.FEB.2014 15:05:44

Low Band Edge Plot on Configuration IEEE 802.11ac 80MHz Nss2MCS0 / CH 155 / Ant. 1+2+3



Date: 10.FEB.2014 15:06:27

4.7. Antenna Requirements

4.7.1. Limit

Except for special regulations, the Low-power Radio-frequency Devices must not be equipped with any jacket for installing an antenna with extension cable. An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

4.7.2. Antenna Connector Construction

Please refer to section 2.4 in this test report; antenna connector complied with the requirements.

5. LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMI Test Receiver	R&S	ESCS 30	100355	9kHz ~ 2.75 GHz	Apr. 12, 2013	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100 MHz	Nov. 23, 2013	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Nov. 23, 2013	Conduction (CO01-CB)
COND Cable	Woken	Cable	01	150kHz ~ 30 MHz	Dec. 04, 2013	Conduction (CO01-CB)
Software	Audix	E3	5.410e	-	-	Conduction (CO01-CB)
BILOG ANTENNA	Schaffner	CBL6112D	22021	20MHz ~ 2GHz	Apr. 16, 2013	Radiation (03CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Nov. 05, 2012*	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz~18GHz	Nov. 01, 2013	Radiation (03CH01-CB)
Horn Antenna	SCHWARZBEAK	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Dec. 17, 2013	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10991	0.1MHz ~ 1.3GHz	Nov. 12, 2013	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Dec. 16, 2013	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26GHz ~ 40GHz	Oct. 23, 2013	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSP40	100019	9kHz~40GHz	Dec. 02, 2013	Radiation (03CH01-CB)
EMI Test Receiver	Agilent	N9038A	MY52260123	9kHz ~ 8GHz	Dec. 12, 2013	Radiation (03CH01-CB)
Turn Table	INN CO	CO 2000	N/A	0 ~ 360 degree	N.C.R	Radiation (03CH01-CB)
Antenna Mast	INN CO	CO2000	N/A	1 m - 4 m	N.C.R	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-1	N/A	30 MHz - 1 GHz	Nov. 17, 2013	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-1	N/A	1 GHz – 26.5 GHz	Nov. 17, 2013	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-2	N/A	1 GHz – 26.5 GHz	Nov. 17, 2013	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-3	N/A	1 GHz - 40 GHz	Nov. 17, 2013	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-4	N/A	1 GHz - 40 GHz	Nov. 17, 2013	Radiation (03CH01-CB)
Signal analyzer	R&S	FSV40	100979	9kHz~40GHz	Nov. 29, 2013	Conducted (TH01-CB)
Temp. and Humidity Chamber	Ten Billion	TTH-D3SP	TBN-931011	-30~100 degree	Jun. 04, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-7	-	1 GHz – 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-8	-	1 GHz – 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)

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Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
RF Cable-high	Woken	High Cable-9	-	1 GHz – 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-10	-	1 GHz – 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-11	-	1 GHz – 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)
Power Sensor	Anritsu	MA2411B	0917223	300MHz~40GHz	Sep. 18, 2013	Conducted (TH01-CB)
Power Meter	Anritsu	ML2495A	1035008	300MHz~40GHz	Sep. 18, 2013	Conducted (TH01-CB)

Note: Calibration Interval of instruments listed above is one year.

*Calibration Interval of instruments listed above is two year.

N.C.R. means Non-Calibration required.

6. MEASUREMENT UNCERTAINTY

Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

Contribution	Uncertainty of x_i			$u(x_i)$
	Value	Unit	Probability Distribution k	
Receiver reading	0.026	dB	normal(k=2)	0.013
Cable loss	0.002	dB	normal(k=2)	0.001
AMN/LISN specification	1.200	dB	normal(k=2)	0.600
Mismatch Receiver VSWR 1= AMN/LISN VSWR 2=	-0.080	dB	U-shaped	0.060
Combined standard uncertainty Uc(y)				1.2
Measuring uncertainty for a level of confidence of 95% U=2Uc(y)				2.4

Uncertainty of Radiated Emission Measurement (30MHz ~ 1,000MHz)

Contribution	Uncertainty of x_i			$u(x_i)$
	Value	Unit	Probability Distribution k	
Receiver reading	±0.173	dB	K=1	0.086
Cable loss	±0.174	dB	K=2	0.087
Antenna gain	±0.169	dB	K=2	0.084
Site imperfection	±0.433	dB	Triangular	0.214
Pre-amplifier gain	±0.366	dB	K=2	0.183
Transmitter antenna	±1.200	dB	Rectangular	0.600
Signal generator	±0.461	dB	Rectangular	0.231
Mismatch	±0.080	dB	U-shape	0.040
Spectrum analyzer	±0.500	dB	Rectangular	0.250
Combined standard uncertainty Uc(y)				1.778
Measuring uncertainty for a level of confidence of 95% U=2Uc(y)				3.555

Uncertainty of Radiated Emission Measurement (1GHz ~ 18GHz)

Contribution	Uncertainty of x_i			$u(x_i)$
	Value	Unit	Probability Distribution k	
Receiver reading	±0.191	dB	K=1	0.095
Cable loss	±0.169	dB	K=2	0.084
Antenna gain	±0.191	dB	K=2	0.096
Site imperfection	±0.582	dB	Triangular	0.291
Pre-amplifier gain	±0.304	dB	K=2	0.152
Transmitter antenna	±1.200	dB	Rectangular	0.600
Signal generator	±0.461	dB	Rectangular	0.231
Mismatch	±0.080	dB	U-shape	0.040
Spectrum analyzer	±0.500	dB	Rectangular	0.250
Combined standard uncertainty Uc(y)				1.839
Measuring uncertainty for a level of confidence of 95% U=2Uc(y)				3.678

Uncertainty of Radiated Emission Measurement (18GHz ~ 40GHz)

Contribution	Uncertainty of x_i			$u(x_i)$
	Value	Unit	Probability Distribution k	
Receiver reading	±0.186	dB	K=1	0.093
Cable loss	±0.167	dB	K=2	0.083
Antenna gain	±0.190	dB	K=2	0.095
Site imperfection	±0.488	dB	Triangular	0.244
Pre-amplifier gain	±0.269	dB	K=2	0.134
Transmitter antenna	±1.200	dB	Rectangular	0.600
Signal generator	±0.461	dB	Rectangular	0.231
Mismatch	±0.080	dB	U-shape	0.040
Spectrum analyzer	±0.500	dB	Rectangular	0.250
Combined standard uncertainty Uc(y)				1.771
Measuring uncertainty for a level of confidence of 95% U=2Uc(y)				3.541

Uncertainty of Conducted Emission Measurement

Contribution	Uncertainty of x_i			$u(x_i)$
	Value	Unit	Probability Distribution k	
Cable loss	±0.038	dB	K=2	0.019
Attenuator	±0.047	dB	K=2	0.024
Power Meter specification	±0.300	dB	Triangular	0.150
Power Sensor specification	±0.300	dB	Rectangular	0.150
Signal generator	±0.461	dB	Rectangular	0.231
Mismatch	±0.080	dB	U-shape	0.040
Spectrum analyzer	±0.500	dB	Rectangular	0.250
Combined standard uncertainty $U_c(y)$				0.863
Measuring uncertainty for a level of confidence of 95% $U=2U_c(y)$				1.726