

FCC Test Report (WLAN)

Report No.: RF150107E07F-1

FCC ID: PPD-QCNFA364AH

Test Model: QCNFA364A

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Test Date: Feb. 06 to 11, 2015 & Sep. 23, 2015

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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A D T

Release Control Record

Issue No.	Description	Date Issued
RF150107E07F-1	Original release.	Sep. 30, 2015



A D T

1 Certificate of Conformity

Product: 802.11a/b/g/n/ac + BT 4.1 M.2 2230 Type Card

Brand: Qualcomm Atheros

Test Model: QCNFA364A

Sample Status: ENGINEERING SAMPLE

Applicant: Qualcomm Atheros, Inc.

Test Date: Feb. 09, 2015 & Sep. 23, 2015

Standard: 47 CFR FCC Part 15, Subpart E (Section 15.407)
ANSI C63.10: 2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by :

Date: Sep. 30, 2015

Lori Chung / Specialist

Approved by :

Date: Sep. 30, 2015

May Chen / Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (SECTION 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b) (1/2/3/4/6)	Radiated Emissions & Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -3.0dB at 5708.00MHz & 5702.00MHz.
15.407(a)(1/2 /3)	Max Average Transmit Power	PASS	Meet the requirement of limit.
15.407(a)(1/2 /3)	Peak Power Spectral Density	PASS	Meet the requirement of limit.
15.407(e)	6dB bandwidth	PASS	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is IPEX not a standard connector.

NOTE: 1. This report is prepared for FCC Class II change. (Upgrade the standard to section 15.407 under new rule for U-NII-3 band)

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.43 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	3.65 dB
	6GHz ~ 18GHz	3.88 dB
	18GHz ~ 40GHz	4.11 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT (U-NII-3)

Product	802.11a/b/g/n/ac + BT 4.1 M.2 2230 Type Card
Brand	Qualcomm Atheros
Test Model	QCNFA364A
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	3.3Vdc form host equipment
Modulation Type	64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode
Modulation Technology	OFDM
Transfer Rate	802.11a: up to 54Mbps 802.11n : up to 300Mbps 802.11ac: up to 866.7Mbps
Operating Frequency	5.745 ~ 5.825GHz
Number of Channel	6 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 3 for 802.11n (HT40), 802.11ac (VHT40) 2 for 802.11ac (VHT80)
Output Power	802.11a: 129.755mW 802.11ac (VHT20): 130.06mW 802.11ac (VHT40): 157.439mW 802.11ac (VHT80): 31.894mW
Antenna Type	See item 3.2
Antenna Connector	See item 3.2
Accessory Device	NA
Data Cable Supplied	NA

Note:

1. This report is prepared for FCC Class II change. The difference compared with the Report No.: RF150107E06B-1 design is as the following:
 - ◆ Upgrade the standard to section 15.407 under new rule for U-NII-3 band.
2. According to above conditions, all test items of U-NII-3 band test item need to be performed, except for AC power conducted emission test item. And all data was verified to meet the requirements.
3. There are Bluetooth technology and WLAN technology used for the EUT.

4. The EUT incorporates a 2T2R function.

2.4GHz Band			
MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION	
802.11b	1 ~ 11Mbps	2TX	2RX
802.11g	6 ~ 54Mbps	2TX	2RX
802.11n (HT20)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
802.11n (HT40)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
VHT20	MCS 0~8, Nss=1	2TX	2RX
	MCS 0~8, Nss=2	2TX	2RX
VHT40	MCS 0~9, Nss=1	2TX	2RX
	MCS 0~9, Nss=2	2TX	2RX
5GHz Band			
MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION	
802.11a	6 ~ 54Mbps	2TX	2RX
802.11n (HT20)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
802.11n (HT40)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
802.11ac (VHT20)	MCS 0~8, Nss=1	2TX	2RX
	MCS 0~8, Nss=2	2TX	2RX
802.11ac (VHT40)	MCS 0~9, Nss=1	2TX	2RX
	MCS 0~9, Nss=2	2TX	2RX
802.11ac (VHT80)	MCS 0~9, Nss=1	2TX	2RX
	MCS 0~9, Nss=2	2TX	2RX

Note: The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz) and 802.11ac mode for 20MHz (40MHz), therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.3.1)

5. In original report , the EUT was pre-tested under the following modes:

Test Mode	Data rate
Mode A	400ns GI
Mode B	800ns GI

From the above modes, the worst case was found in **Mode B**. Therefore only the test data of the mode was recorded in this report.

6. WLAN/BT coexistence mode:

◆ 2x2 WLAN + BT:

- 5GHz 802.11a/an (or 11ac) transmit concurrent with BT.
- 2.4GHz: timely shared coexistence.

7. In original report, the emission (conducted & radiated emission) of the simultaneous operation (WiFi <5GHz> & Bluetooth) have been evaluated and no non-compliance found. The detail combinations of transmitters / frequencies / modes as below table

Mode	Available Channel	Tested Channel	Modulation Technology
5 GHz (802.11ac (VHT40))	38 to 159	159	OFDM
+			
Bluetooth (LE)	0 to 39	0	GFSK

8. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 Description of Antenna

The antenna gain was declared by client; please refer to the following table:

Transmitter Circuit	Brand	Model	Ant. Type	2.4GHz Gain with cable loss (dBi)	5GHz Gain with cable loss (dBi)	2.4GHz Cable Loss (dBi)	5G Cable Loss (dBi)	Connector Type	Cable Length (mm)
Chain (0)	WNC	81-EBJ15.005	PIFA	3.00	Band 1&2: 2.56	1.15	Band 1&2: 1.70	IPEX	300
					Band 3: 4.76		Band 3: 1.74		
					Band 4: 4.76		Band 4: 1.79		
Chain (1)	WNC	81-EBJ15.005	PIFA	3.62	Band 1&2: 3.08	1.15	Band 1&2: 1.70	IPEX	300
					Band 3: 3.31		Band 3: 1.74		
					Band 4: 2.42		Band 4: 1.79		

Note: 1. Above antenna gains of antenna are Total (H+V).

For Testing, we select the highest gain on each frequency band for calculation and testing

The detail information as below:

Transmitter Circuit	Brand	Model	Ant. Type	2.4GHz Gain with cable loss (dBi)	5GHz Gain with cable loss (dBi)	2.4GHz Cable Loss (dBi)	5G Cable Loss (dBi)	Connector Type	Cable Length (mm)
Chain (0)+(1)	WNC	81-EBJ15.005	PIFA	3.62	Band 1&2: 3.08	1.15	Band 1&2: 1.70	IPEX	300
					Band 3: 4.76		Band 3: 1.74		
					Band 4: 4.76		Band 4: 1.79		

3.3 Description of Test Modes

FOR 5745 ~ 5825MHz:

5 channels are provided for 802.11a, 802.11ac (VHT20), 802.11ac (VHT20):

Channel	Frequency	Channel	Frequency
149	5745MHz	161	5805MHz
153	5765MHz	165	5825MHz
157	5785MHz		

2 channels are provided for 802.11ac (VHT40), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775MHz

FOR channel straddling 5725MHz:

1 channel is provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency
144	5720 MHz

1 channel is provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency
142	5710 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
138	5690 MHz

3.3.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	UE≥1G	UE<1G	PLC	APCM	
-	√	√	-	√	-

Where **UE≥1G**: Unwanted Emission above 1GHz

UE<1G: Unwanted Emission below 1GHz

PLC: Power Line Conducted Emission

APCM: Antenna Port Conducted Measurement

NOTE:

1. "-" means no effect.

Unwanted Emission Test (Above 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

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

MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	DATA RATE (Mbps)
802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6
802.11ac (VHT20)		149 to 165	149, 157, 165	OFDM	6.5
802.11ac (VHT40)		151 to 159	151, 159	OFDM	13.5
802.11ac (VHT80)		155	155	OFDM	29.3
802.11a	straddling 5725MHz	144	144	OFDM	6
802.11ac (VHT20)		144	144	OFDM	6.5
802.11ac (VHT40)		142	142	OFDM	13.5
802.11ac (VHT80)		138	138	OFDM	29.3

Unwanted Emission Test (Below 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

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

MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	DATA RATE (Mbps)
802.11ac (VHT40)	151 to 159	159	OFDM	BPSK	13.5

Antenna Port Conducted Measurement:

- ☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	DATA RATE (Mbps)
802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6
802.11ac (VHT20)		149 to 165	149, 157, 165	OFDM	6.5
802.11ac (VHT40)		151 to 159	151, 159	OFDM	13.5
802.11ac (VHT80)		155	155	OFDM	29.3
802.11a	straddling 5725MHz	144	144	OFDM	6
802.11ac (VHT20)		144	144	OFDM	6.5
802.11ac (VHT40)		142	142	OFDM	13.5
802.11ac (VHT80)		138	138	OFDM	29.3

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
UE≥1G	25deg. C, 69%RH	120Vac, 60Hz	Weiwei Lo
UE<1G	24deg. C, 66%RH	120Vac, 60Hz	Weiwei Lo
APCM	25deg. C, 65%RH	120Vac, 60Hz	Anderson Chen

3.4 Duty Cycle of Test Signal

If duty cycle of test signal is $\geq 98\%$, duty factor is not required.

If duty cycle of test signal is $< 98\%$, duty factor shall be considered.

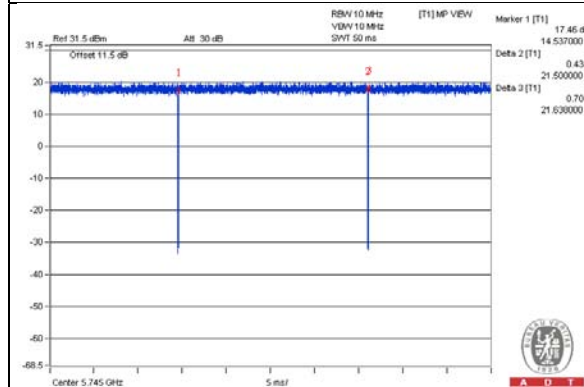
802.11a: Duty cycle = 21.5 ms/21.638 ms = 0.994

802.11ac (VHT20): Duty cycle = 19.875 ms/19.981 ms = 0.995

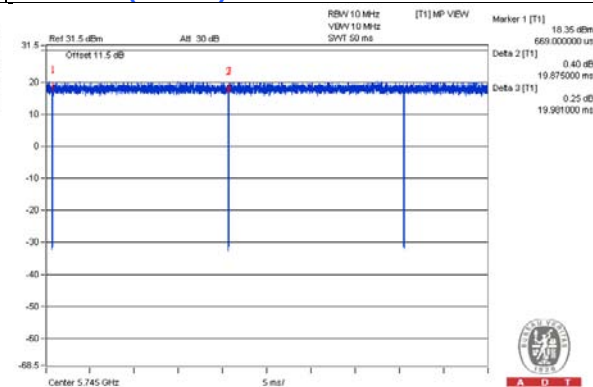
802.11ac (VHT40): Duty cycle = 9.588 ms/9.731 ms = 0.985

802.11ac (VHT80): Duty cycle = 4.428 ms/4.527 ms = 0.978, Duty factor = $10 * \log(1/0.978) = 0.10$

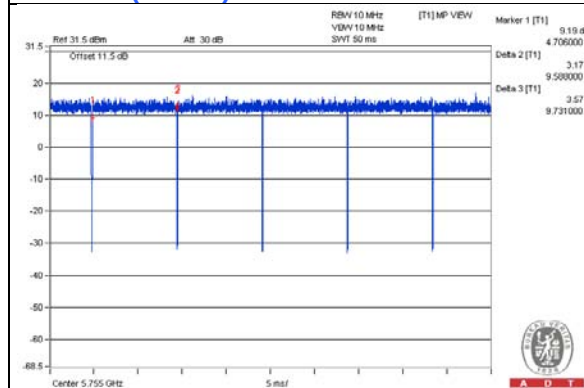
802.11a



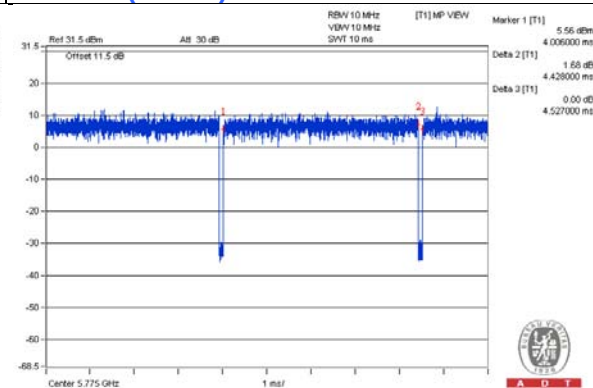
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)



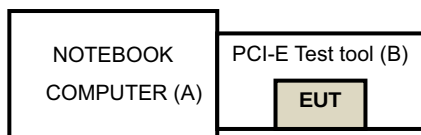
3.5 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Product	Brand	Model No.	Serial No.	FCC ID	Remark
A	NOTEBOOK COMPUTER	DELL	E5430	4YV4VY1	FCC DoC	Provided by Lab
B	PCI-E Test tool	Qualcomm Atheros	NA	NA	NA	Supplied by Client

NOTE: All power cords of the above support units are non-shielded (1.8 m).

3.5.1 Configuration of System under Test



3.6 General Description of Applied Standard

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart E (15.407)

789033 D02 General UNII Test Procedure New Rules v01

662911 D01 Multiple Transmitter Output v02r01

ANSI C63.10- 2013

All test items have been performed and recorded as per the above standards.

4 Test Types and Results

4.1 Transmit Power Measurement

4.1.1 Limits of Transmit Power Measurement

Operation Band	EUT Category		LIMIT
U-NII-1		Outdoor Access Point	1 Watt (30 dBm) (Max. e.i.r.p $\leq$ 125mW(21 dBm) at any elevation angle above 30 degrees as measured from the horizon)
		Fixed point-to-point Access Point	1 Watt (30 dBm)
		Indoor Access Point	1 Watt (30 dBm)
		Mobile and Portable client device	250mW (24 dBm)
U-NII-2A			250mW (24 dBm) or 11 dBm+10 log B*
U-NII-2C			250mW (24 dBm) or 11 dBm+10 log B*
U-NII-3		√	1 Watt (30 dBm)

Note: *B is the 26 dB emission bandwidth in megahertz

Per KDB 662911 D01 Multiple Transmitter Output v02r01 Method of conducted output power measurement on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;

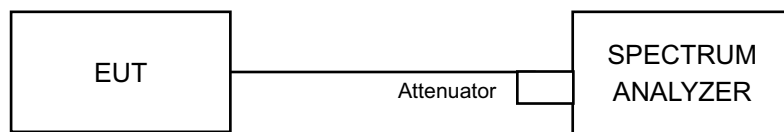
Array Gain = $5 \log(N_{ANT}/N_{SS})$ dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

For power measurements on all other devices: Array Gain = $10 \log(N_{ANT}/N_{SS})$ dB.

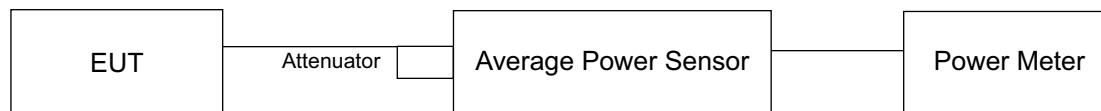
4.1.2 Test Setup

FOR POWER OUTPUT MEASUREMENT

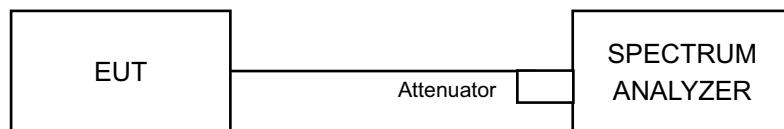
For channel straddling 5725MHz:



For other channels:



FOR 26dB OCCUPIED BANDWIDTH



4.1.3 Test Instruments

FOR POWER OUTPUT MEASUREMENT

For channel straddling 5725MHz:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSP 40	100060	May 08, 2014	May 07, 2015

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date :Feb. 09, 2015

For other channels:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power Meter Anritsu	ML2495A	1014008	Apr. 28, 2015	Apr. 27, 2016
Power Sensor Anritsu	MA2411B	0917122	Apr. 28, 2015	Apr. 27, 2016

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Sep. 23, 2015

FOR 26dB OCCUPIED BANDWIDTH

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSP 40	100060	May 08, 2014	May 07, 2015

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date :Feb. 09, 2015

4.1.4 Test Procedures

FOR AVERAGE POWER MEASUREMENT

For channel straddling 5725MHz:

Follow FCC KDB 789033 UNII test procedure:

802.11ac (VHT80)

Method SA-2

1. Set span to encompass the emission bandwidth (EBW) of the signal.
2. Set RBW = 1MHz.
3. Set the VBW $\geq 3 \times$ RBW.
4. Number of points in sweep $\geq 2 \text{ Span} / \text{RBW}$.
5. Sweep time = auto.
6. Detector = RMS.
7. Trace average at least 100 traces in power averaging mode
8. Compute power by integrating the spectrum across the 26 dB EBW of the signal.
9. Duty factor need added to measured value (duty cycle < 98 percent).

Other Modulation mode

Method SA-1

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 1MHz.
3. Set the VBW $\geq 3 \times$ RBW.
4. Number of points in sweep $\geq 2 \text{ Span} / \text{RBW}$.
5. Sweep time = auto.
6. Set trigger to free run (duty cycle ≥ 98 percent) ; Set video trigger (duty cycle < 98 percent)
7. Detector = RMS.
8. Trace average at least 100 traces in power averaging mode
9. Compute power by integrating the spectrum across the 26 dB EBW of the signal.

For other channels:

Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

FOR 26dB OCCUPIED BANDWIDTH

1. Set RBW = approximately 1% of the emission bandwidth.
2. Set the VBW > RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

4.1.5 Deviation from Test Standard

No deviation.

4.1.6 EUT Operating Conditions

The software (QRCT Version: 3.0.33.0) provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.1.7 Test Results

POWER OUTPUT

802.11a

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
149	5745	15.03	15.38	66.356	18.22	28.23	Pass
157	5785	18.03	18.21	129.755	21.13	28.23	Pass
165	5825	18.16	18.00	128.56	21.09	28.23	Pass
*144 (UNII-2C Band)	5720	12.95	12.51	37.548	15.75	21.25	Pass
*144 (UNII-3 Band)	5720	5.79	5.22	7.12	8.52	28.23	Pass

NOTE: 1. 5470~5725MHz: Directional gain = 4.76dBi + 10log(2) = 7.77dBi > 6dBi , so the power limit shall be reduced to "Determined Conducted Limit-(7.77-6)".

2. 5725~5850MHz: 4.76dBi + 10log(2) = 7.77dBi > 6dBi , therefore the limit needs to reduce, so the power limit shall be reduced to 30-(7.77-6) = 28.23dBm.

* Test was performed in accordance with Measurement follow FCC KDB 789033 UNII test procedure Method SA-1 and use spectrum analyzer test.

The Total Power for the straddle channel:

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
*144	5720	44.668	16.50

Note: The total power was calculated through formula and record the value for reference only.

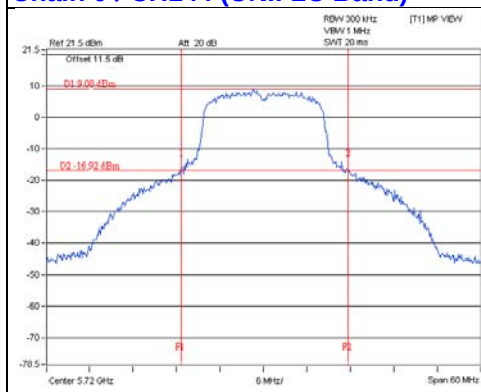
26dB OCCUPIED BANDWIDTH

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
144 (UNII-2C Band)	5720	16.49	15.93

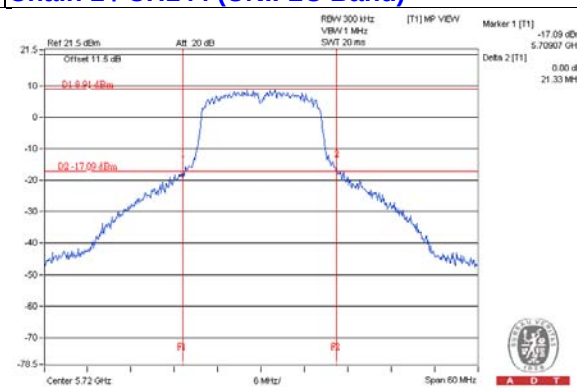
Note: For U-NII-2C Band output power limitation is determined based on 26dBc bandwidth.

Power Limit = 11dBm + 10logB < U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
144 (UNII-2C Band)	5720	15.93	23.02 < 24

Chain 0 / CH144 (UNII-2C Band)



Chain 1 / CH144 (UNII-2C Band)



NOTE:

For CH144 (UNII-2C Band) = 5725MHz - Marker 1

For Reference only – Power meter value

The power value was measured by power meter with average sensor.

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
144	5720	17.89	17.40	116.472	20.66

Note: The total power was calculated through formula and record the value for reference only.

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
149	5745	15.04	15.01	63.611	18.04	28.23	Pass
157	5785	18.03	18.23	130.06	21.14	28.23	Pass
165	5825	16.98	17.55	106.773	20.28	28.23	Pass
*144 (UNII-2C Band)	5720	12.72	12.37	35.965	15.56	21.24	Pass
*144 (UNII-3 Band)	5720	5.93	5.44	7.416	8.70	28.23	Pass

NOTE: 1. 5470~5725MHz: Directional gain = $4.76\text{dBi} + 10\log(2) = 7.77\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to "Determined Conducted Limit-(7.77-6)".

2. 5725~5850MHz: $4.76\text{dBi} + 10\log(2) = 7.77\text{dBi} > 6\text{dBi}$, therefore the limit needs to reduce, so the power limit shall be reduced to $30-(7.77-6) = 28.23\text{dBm}$.

* Test was performed in accordance with Measurement follow FCC KDB 789033 UNII test procedure Method SA-1 and use spectrum analyzer test.

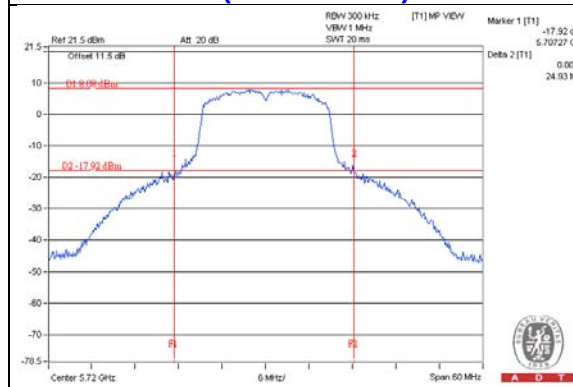
26dB OCCUPIED BANDWIDTH

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
144 (UNII-2C Band)	5720	17.73	15.90

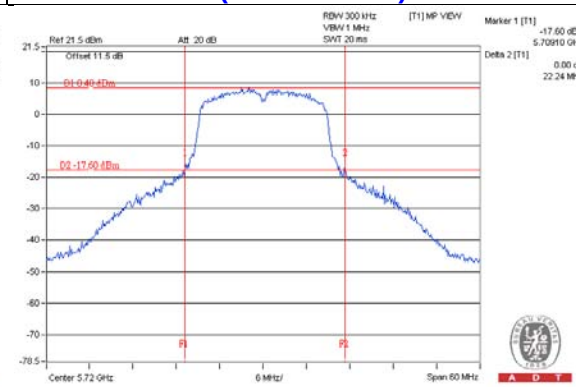
Note: For U-NII-2C Band output power limitation is determined based on 26dBc bandwidth.

Power Limit = 11dBm + 10logB < U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
144 (UNII-2C Band)	5720	15.90	23.01 < 24

Chain 0 / CH144 (UNII-2C Band)



Chain 1 / CH144 (UNII-2C Band)



NOTE:

For CH144 (UNII-2C Band) = 5725MHz - Marker 1

For Reference only – Power meter value

The power value was measured by power meter with average sensor.

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
144	5720	17.98	17.28	116.262	20.65

Note: The total power was calculated through formula and record the value for reference only.

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
151	5755	12.78	12.37	36.225	15.59	28.23	Pass
159	5795	19.18	18.73	157.439	21.97	28.23	Pass
*142 (UNII-2C Band)	5710	12.88	12.78	38.376	15.84	22.23	Pass
*142 (UNII-3 Band)	5710	0.93	0.07	2.255	3.53	28.23	Pass

NOTE: 1. 5470~5725MHz: Directional gain = 4.76dBi + 10log(2) = 7.77dBi > 6dBi , so the power limit shall be reduced to "Determined Conducted Limit-(7.77-6)".

2. 5725~5850MHz: 4.76dBi + 10log(2) = 7.77dBi > 6dBi , therefore the limit needs to reduce, so the power limit shall be reduced to 30-(7.77-6) = 28.23dBm.

* Test was performed in accordance with Measurement follow FCC KDB 789033 UNII test procedure Method SA-1 and use spectrum analyzer test.

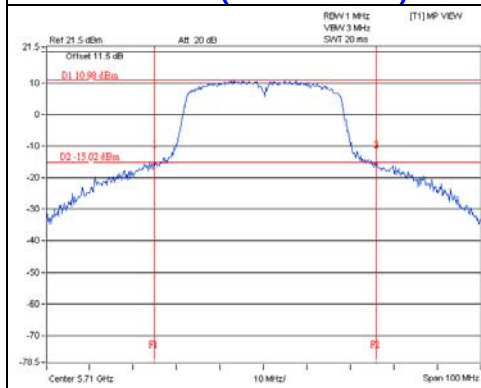
26dB OCCUPIED BANDWIDTH

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
142 (UNII-2C Band)	5710	40.20	36.74

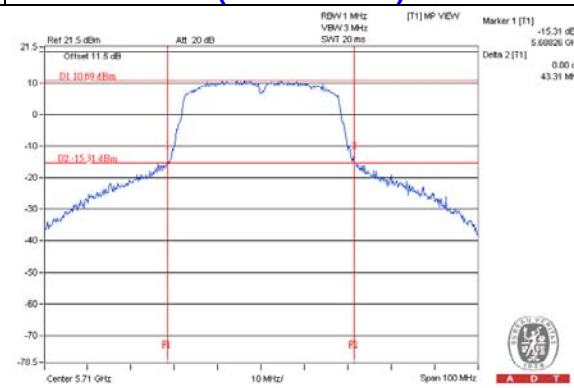
Note: For U-NII-2C Band output power limitation is determined based on 26dBc bandwidth.

Power Limit = 11dBm + 10logB < U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
142 (UNII-2C Band)	5710	36.74	26.65 > 24

Chain 0 / CH142 (UNII-2C Band)



Chain 1 / CH142 (UNII-2C Band)



NOTE:

For CH142 (UNII-2C Band) = 5725MHz - Marker 1

For Reference only – Power meter value

The power value was measured by power meter with average sensor.

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
142	5710	17.88	17.23	114.221	20.58

Note: The total power was calculated through formula and record the value for reference only.

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
155	5775	11.90	12.15	31.894	15.04	28.23	Pass
*138 (UNII-2C Band)	5690	11.16	10.78	25.671	14.09	22.23	Pass
*138 (UNII-3 Band)	5690	-4.53	-5.79	0.632	-1.99	28.23	Pass

NOTE: 1. 5470~5725MHz: Directional gain = 4.76dBi + 10log(2) = 7.77dBi > 6dBi , so the power limit shall be reduced to "Determined Conducted Limit-(7.77-6)".

2. 5725~5850MHz: 4.76dBi + 10log(2) = 7.77dBi > 6dBi , therefore the limit needs to reduce, so the power limit shall be reduced to 30-(7.77-6) = 28.23dBm.

* Test was performed in accordance with Measurement follow FCC KDB 789033 UNII test procedure Method SA-1 and use spectrum analyzer test.

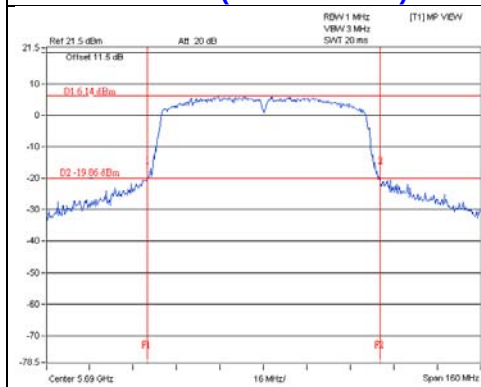
26dB OCCUPIED BANDWIDTH

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
138 (UNII-2C Band)	5690	77.98	76.93

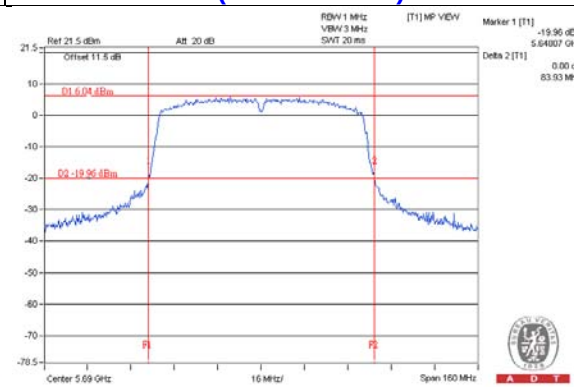
Note: For U-NII-2C Band output power limitation is determined based on 26dBc bandwidth.

Power Limit = 11dBm + 10logB < U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
138 (UNII-2C Band)	5690	76.93	29.86 > 24

Chain 0 / CH138 (UNII-2C Band)



Chain 1 / CH138 (UNII-2C Band)



NOTE:

For CH138 (UNII-2C Band) = 5725MHz - Marker 1

For Reference only – Power meter value

The power value was measured by power meter with average sensor.

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
138	5690	16.37	15.93	82.525	19.17

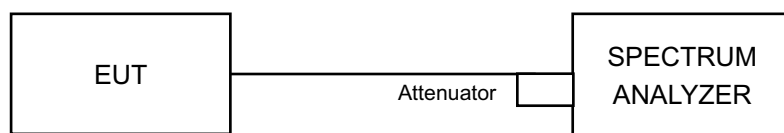
Note: The total power was calculated through formula and record the value for reference only.

4.2 Peak Power Spectral Density Measurement

4.2.1 Limits of Peak Power Spectral Density Measurement

Operation Band	EUT Category		LIMIT
U-NII-1		Outdoor Access Point	17dBm/ MHz
		Fixed point-to-point Access Point	
		Indoor Access Point	
		Mobile and Portable client device	11dBm/ MHz
U-NII-2A			11dBm/ MHz
U-NII-2C			11dBm/ MHz
U-NII-3	√		30dBm/ 500kHz

4.2.2 Test Setup



4.2.3 Test Instruments

For channel straddling 5725MHz:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSP 40	100060	May 08, 2014	May 07, 2015

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date :Feb. 09, 2015

For other channels:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSP 40	100060	May 08, 2015	May 07, 2016

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Sep. 23, 2015

4.2.4 Test Procedures

For U-NII-2C:

- a. Set span to encompass the entire emission bandwidth (EBW) of the signal.
- b. Set RBW = 1 MHz, Set VBW $\geq$ 3 MHz, Detector = RMS
- c. Sweep time = auto, trigger set to "free run".
- d. Trace average at least 100 traces in power averaging mode.
- e. Record the max value and for duty cycle of test signal is $< 98\%$ add $10 \log (1/\text{duty cycle})$
- f. Record the max value

For U-NII-3:

- a. Set span to encompass the entire emission bandwidth (EBW) of the signal.
- b. Set RBW = 300 kHz, Set VBW $\geq$ 1 MHz, Detector = RMS
- c. Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
- d. Scale the observed power level to an equivalent value in 500 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where $\text{BWCF} = 10 \log(500 \text{ kHz}/300 \text{ kHz})$
- e. Sweep time = auto, trigger set to "free run".
- f. Trace average at least 100 traces in power averaging mode.
- g. Record the max value and for duty cycle of test signal is $< 98\%$ add $10 \log (1/\text{duty cycle})$

4.2.5 Deviation from Test Standard

No deviation.

4.2.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.2.7 Test Results

For U-NII-2C:

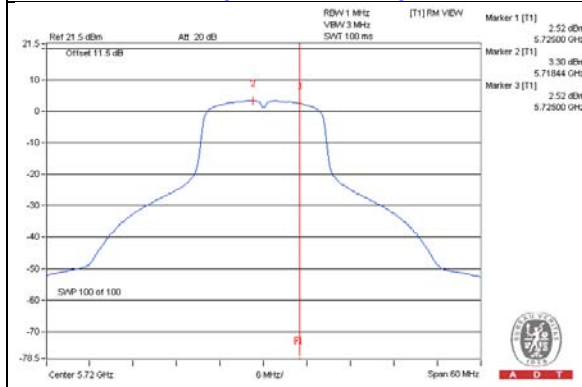
802.11a

Chan.	Chan. Freq. (MHz)	PSD (dBm)		Total Power Density (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1			
144 (UNII-2C Band)	5720	3.30	2.99	6.16	9.23	Pass

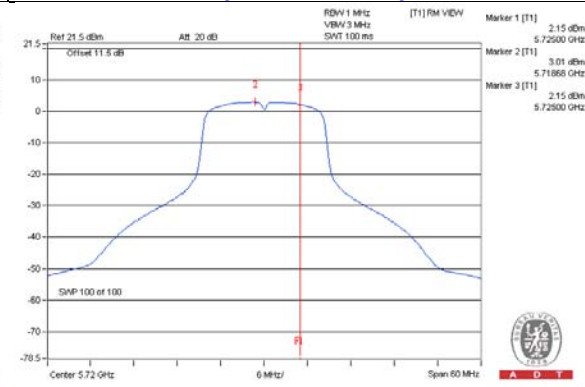
NOTE: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.

2. 5470~5725MHz: Directional gain = $4.76\text{dBi} + 10\log(2) = 7.77\text{dBi} > 6\text{dB}$, so the power density limit shall be reduced to $11-(7.77-6) = 9.23\text{dBm}$.

Chain 0 / CH144 (UNII-2C Band)



Chain 1 / CH144 (UNII-2C Band)

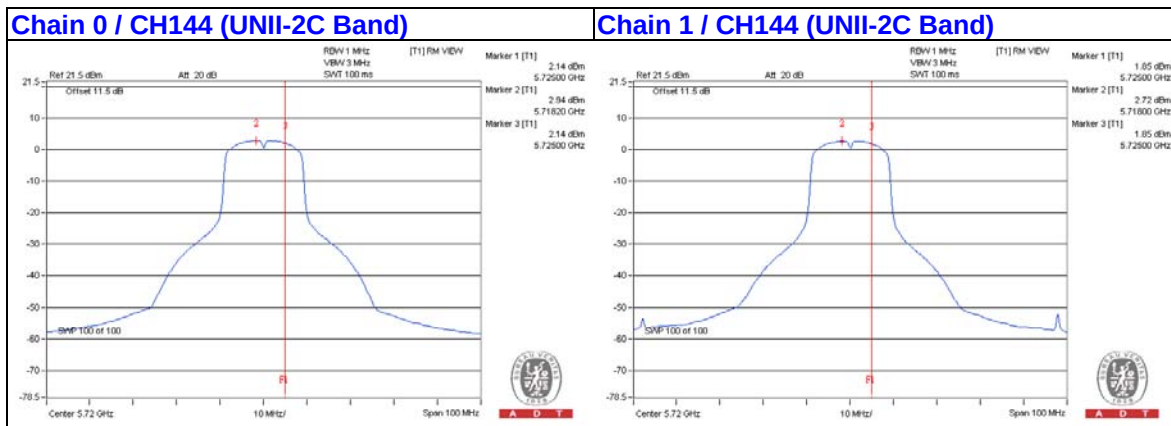


802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	PSD (dBm)		Total Power Density (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1			
144 (UNII-2C Band)	5720	2.94	2.72	5.84	9.23	Pass

NOTE: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.

2. 5470~5725MHz: Directional gain = 4.76dBi + 10log(2) = 7.77dBi > 6dB, so the power density limit shall be reduced to 11-(7.77-6) = 9.23dBm.

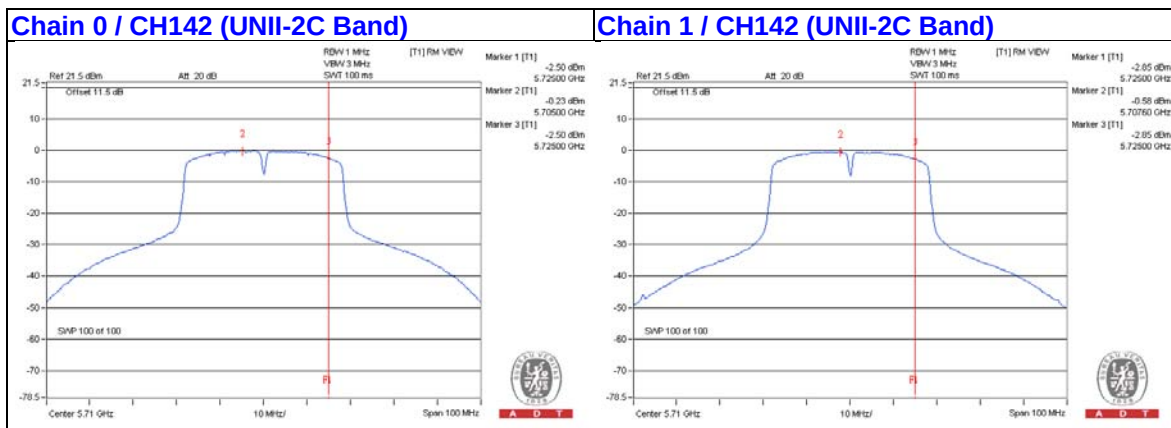


802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	PSD (dBm)		Total Power Density (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1			
142 (UNII-2C Band)	5710	-0.23	-0.59	2.60	9.23	Pass

NOTE: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.

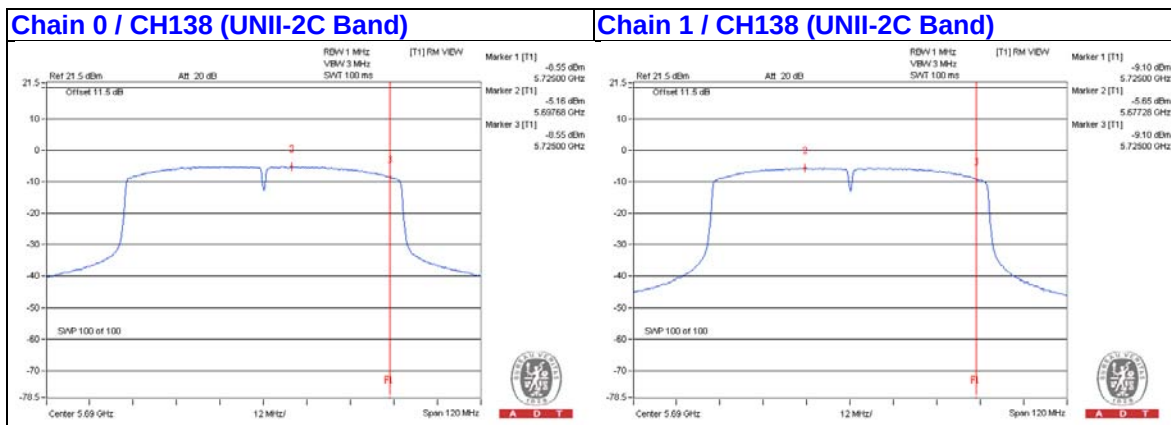
2. 5470~5725MHz: Directional gain = 4.76dBi + 10log(2) = 7.77dBi > 6dB, so the power density limit shall be reduced to 11-(7.77-6) = 9.23dBm.



802.11ac (VHT80):

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm)		Duty Factor (dB)	Total PSD With Duty Factor (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
138 (UNII-2C Band)	5690	-5.16	-5.73	0.11	-2.32	9.23	Pass

- NOTE:** 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. 5470~5725MHz: Directional gain = 4.76dBi + 10log(2) = 7.77dBi > 6dB, so the power density limit shall be reduced to 11-(7.77-6) = 9.23dBm.
5. Refer to section 3.4 for duty cycle spectrum plot.



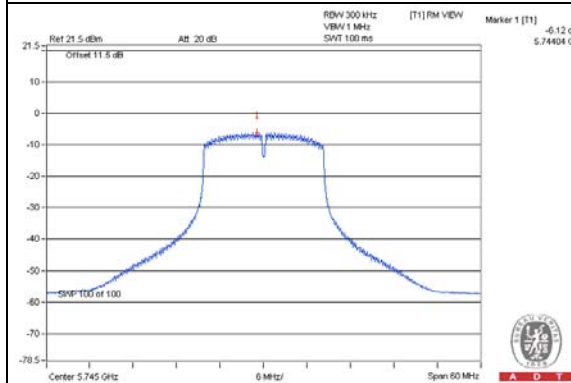
For U-NII-3:

802.11a

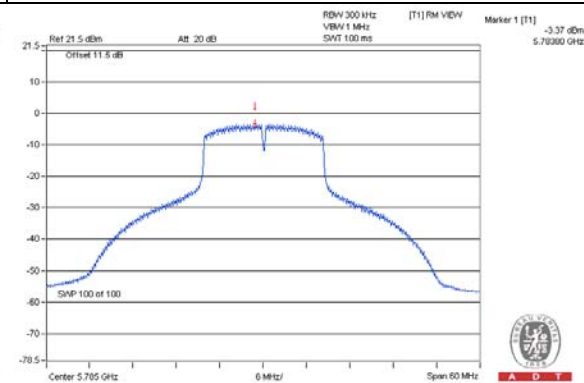
TX chain	Chan.	Chan. Freq. (MHz)	PSD		10 log (N=2) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)				
0	149	5745	-6.12	-3.90	3.01	-0.89	28.23	Pass
	157	5785	-3.37	-1.15	3.01	1.86	28.23	Pass
	165	5825	-3.96	-1.74	3.01	1.27	28.23	Pass
	144 (UNII-3 Band)	5720	-5.50	-3.28	3.01	-0.27	28.23	Pass
1	149	5745	-5.79	-3.57	3.01	-0.56	28.23	Pass
	157	5785	-3.32	-1.10	3.01	1.91	28.23	Pass
	165	5825	-3.26	-1.04	3.01	1.97	28.23	Pass
	144 (UNII-3 Band)	5720	-5.86	-3.64	3.01	-0.63	28.23	Pass

NOTE: 1. 5725~5850MHz: Directional gain = 4.76dBi + 10log(2) = 7.77dBi > 6dB, so the power density limit shall be reduced to 30-(7.77-6) = 28.23dBm.

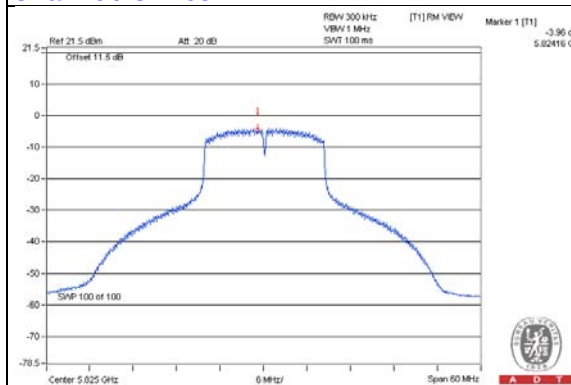
Chain 0 / CH149



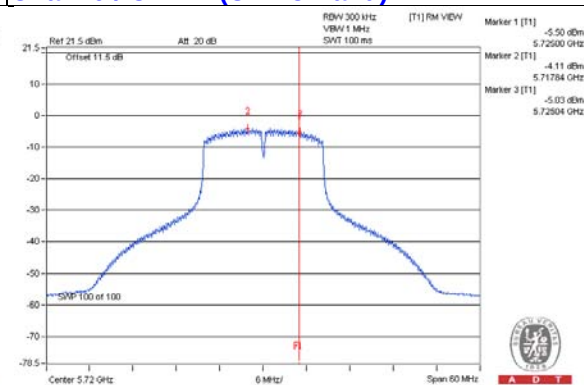
Chain 0 / CH157



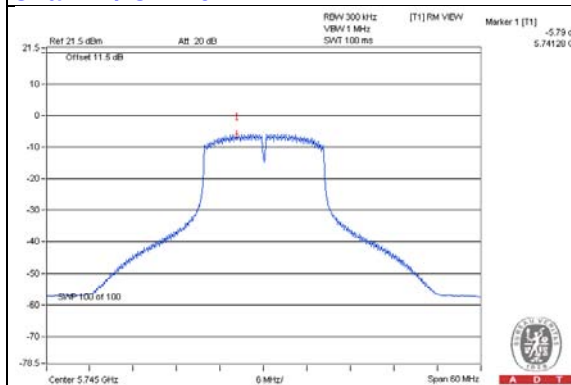
Chain 0 / CH165



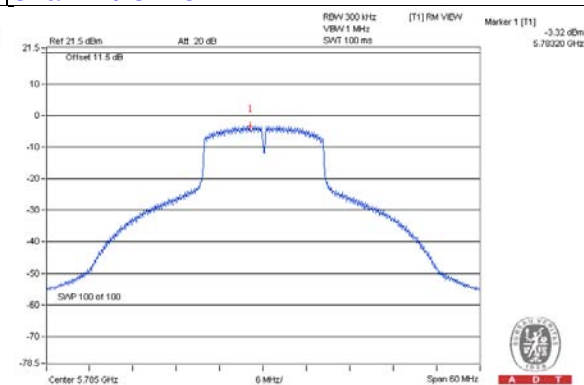
Chain 0 / CH144 (UNII-3 Band)



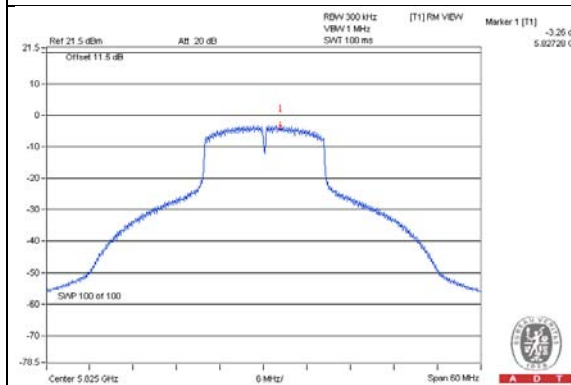
Chain 1 / CH149



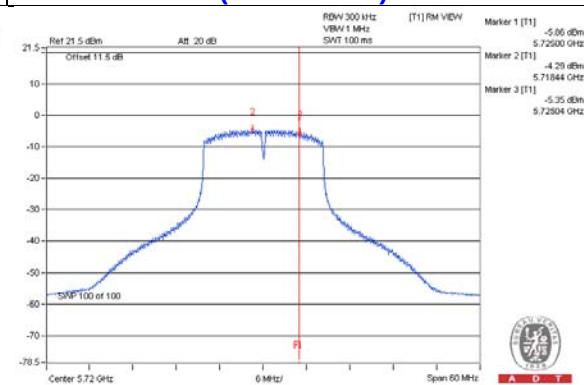
Chain 1 / CH157



Chain 1 / CH165



Chain 1 / CH144 (UNII-3 Band)

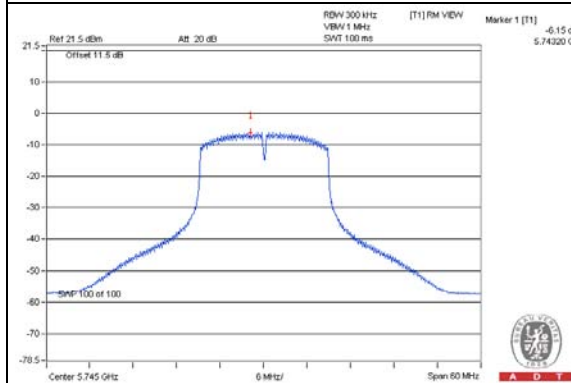


802.11ac (VHT20)

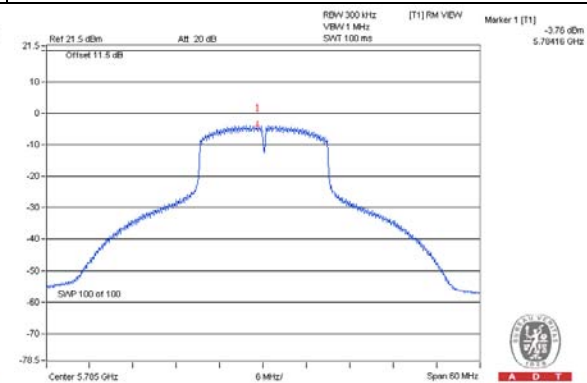
TX chain	Chan.	Chan. Freq. (MHz)	PSD		10 log (N=2) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)				
0	149	5745	-6.15	-3.93	3.01	-0.92	28.23	Pass
	157	5785	-3.76	-1.54	3.01	1.47	28.23	Pass
	165	5825	-4.85	-2.63	3.01	0.38	28.23	Pass
	144 (UNII-3 Band)	5720	-5.78	-3.56	3.01	-0.55	28.23	Pass
1	149	5745	-6.06	-3.84	3.01	-0.83	28.23	Pass
	157	5785	-3.70	-1.48	3.01	1.53	28.23	Pass
	165	5825	-4.14	-1.92	3.01	1.09	28.23	Pass
	144 (UNII-3 Band)	5720	-5.85	-3.63	3.01	-0.62	28.23	Pass

NOTE: 1. 5725~5850MHz: Directional gain = 4.76dBi + 10log(2) = 7.77dBi > 6dB, so the power density limit shall be reduced to 30-(7.77-6) = 28.23dBm.

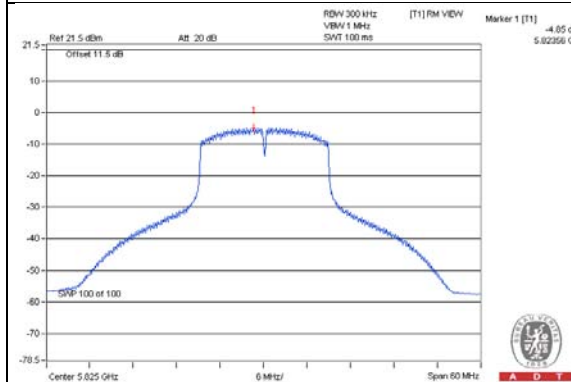
Chain 0 / CH149



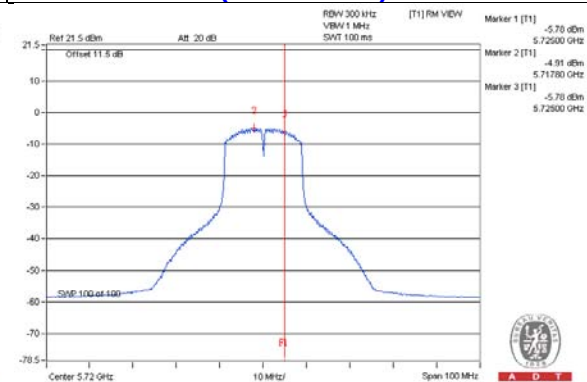
Chain 0 / CH157



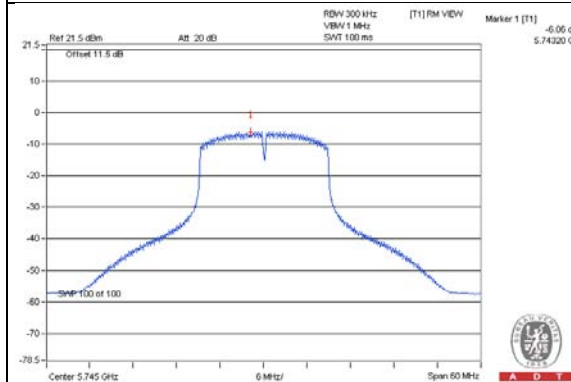
Chain 0 / CH165



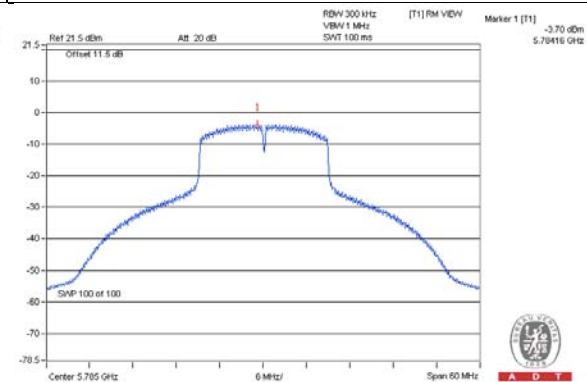
Chain 0 / CH144 (UNII-3 Band)



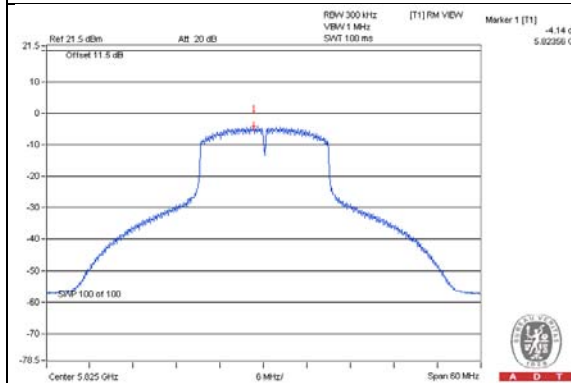
Chain 1 / CH149



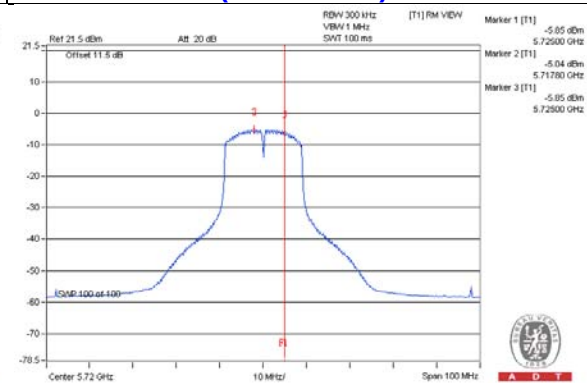
Chain 1 / CH157



Chain 1 / CH165



Chain 1 / CH144 (UNII-3 Band)

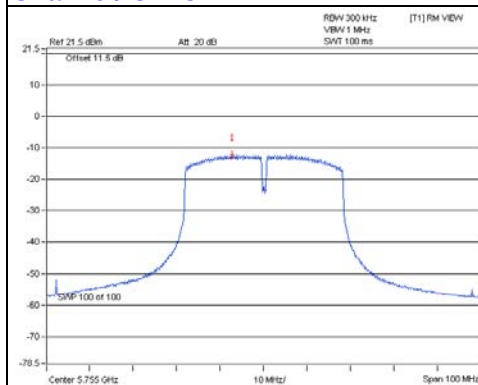


802.11ac (VHT40)

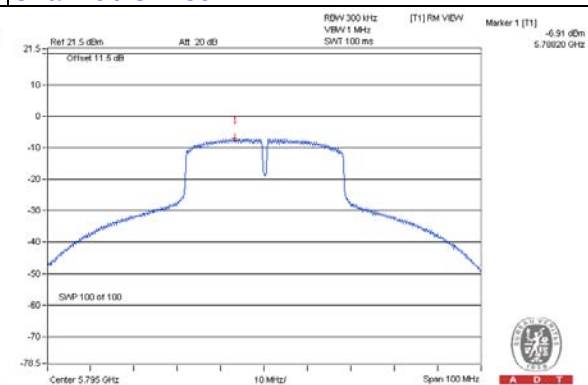
TX chain	Chan.	Chan. Freq. (MHz)	PSD		10 log (N=2) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)				
0	151	5755	-12.30	-10.08	3.01	-7.07	28.23	Pass
	159	5795	-6.91	-4.69	3.01	-1.68	28.23	Pass
	142 (UNII-3 Band)	5710	-10.25	-8.03	3.01	-5.02	28.23	Pass
1	151	5755	-12.16	-9.94	3.01	-6.93	28.23	Pass
	159	5795	-6.73	-4.51	3.01	-1.50	28.23	Pass
	142 (UNII-3 Band)	5710	-10.65	-8.43	3.01	-5.42	28.23	Pass

NOTE: 1. 5725~5850MHz: Directional gain = 4.76dBi + 10log(2) = 7.77dBi > 6dB, so the power density limit shall be reduced to 30-(7.77-6) = 28.23dBm.

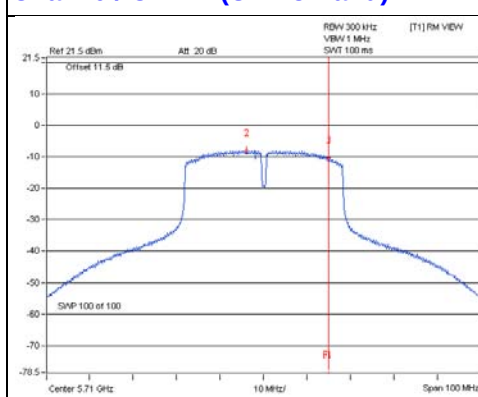
Chain 0 / CH151



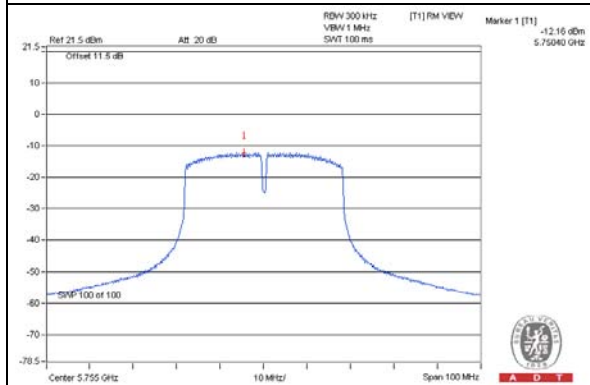
Chain 0 / CH159



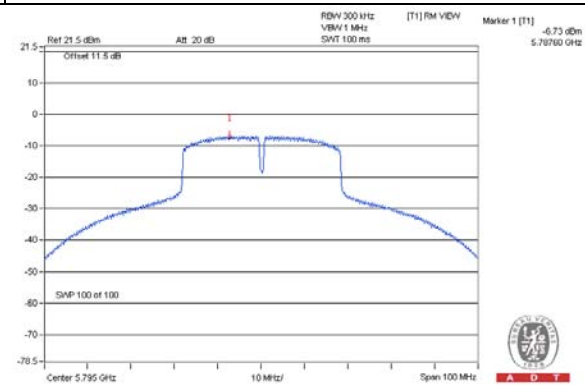
Chain 0 / CH142 (UNII-3 Band)



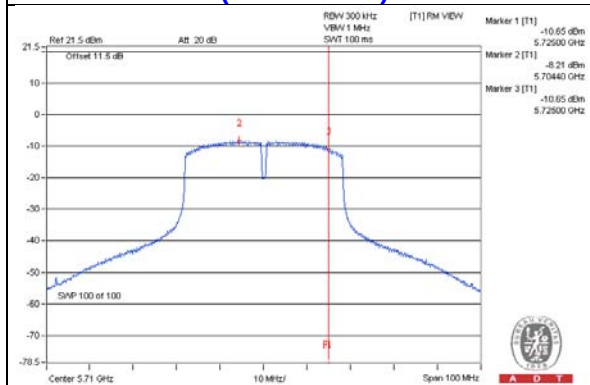
Chain 1 / CH151



Chain 1 / CH159



Chain 1 / CH142 (UNII-3 Band)



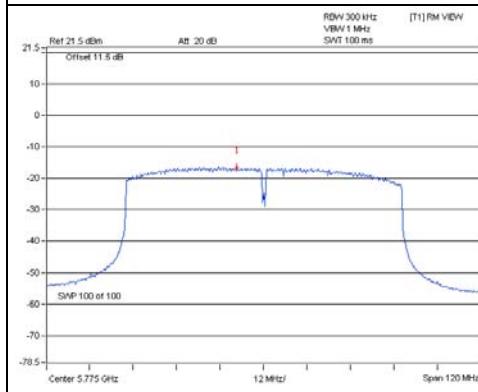
802.11ac (VHT80)

TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	155	5775	-16.52	-14.30	3.01	0.10	-11.19	28.23	Pass
	138 (UNII-3 Band)	5690	-16.79	-14.57	3.01	0.11	-11.45	28.23	Pass
1	155	5775	-16.34	-14.12	3.01	0.10	-11.01	28.23	Pass
	138 (UNII-3 Band)	5690	-17.33	-15.11	3.01	0.11	-11.99	28.23	Pass

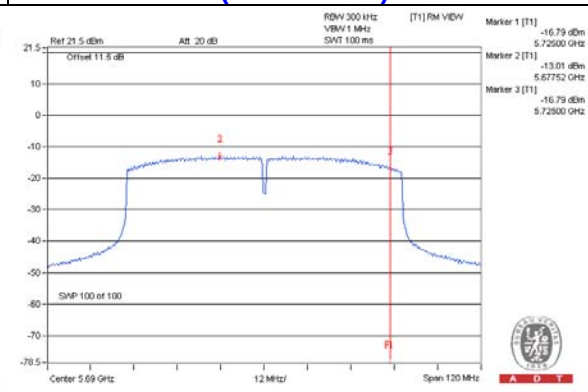
NOTE: 1. 5725~5850MHz: Directional gain = 4.76dBi + 10log(2) = 7.77dBi > 6dB, so the power density limit shall be reduced to 30-(7.77-6) = 28.23dBm.

2. Refer to section 3.4 for duty cycle spectrum plot.

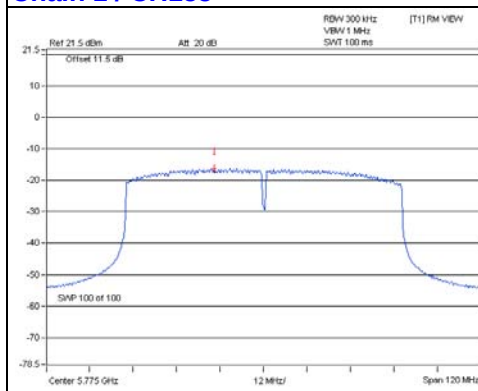
Chain 0 / CH155



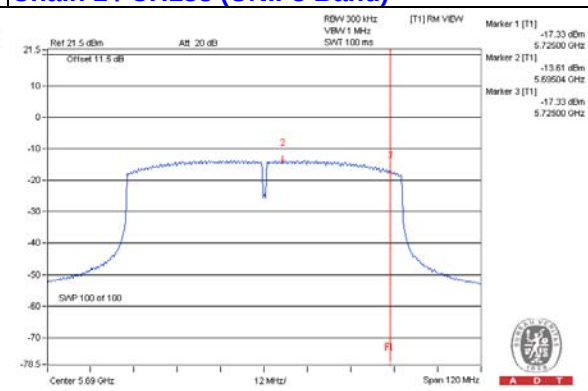
Chain 0 / CH138 (UNII-3 Band)



Chain 1 / CH155



Chain 1 / CH138 (UNII-3 Band)

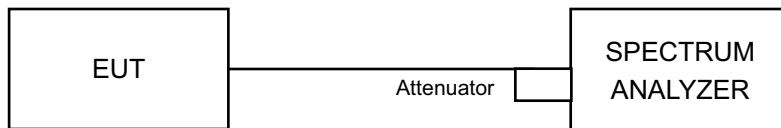


4.3 6dB Bandwidth Measurement

4.3.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.3.2 Test Setup



4.3.3 Test Instruments

For channel straddling 5725MHz:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSP 40	100060	May 08, 2014	May 07, 2015

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date :Feb. 09, 2015

For other channels:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSP 40	100060	May 08, 2015	May 07, 2016

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Sep. 23, 2015

4.3.4 Test Procedures

MEASUREMENT PROCEDURE REF

- a. Set resolution bandwidth (RBW) = 100kHz
- b. Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
- c. Trace mode = max hold.
- d. Sweep = auto couple.
- e. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.3.7 Test Results

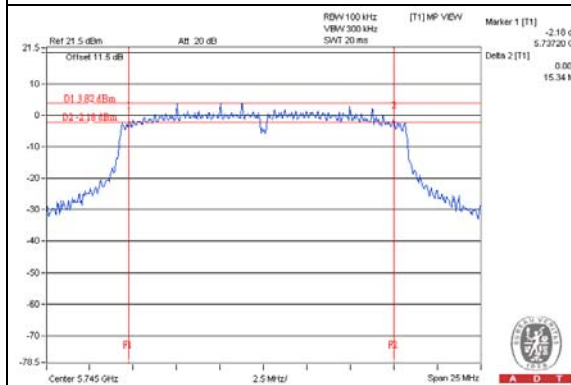
802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	15.34	15.19	0.5	Pass
157	5785	16.41	16.36	0.5	Pass
165	5825	15.09	16.07	0.5	Pass
144 (UNII-3 Band)	5720	2.75	2.58	0.5	Pass

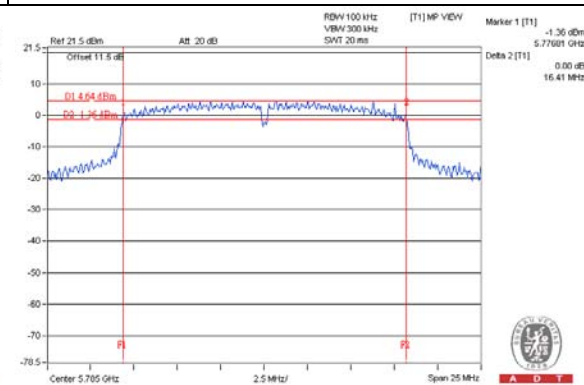
NOTE:

The 6dB bandwidth above 5725MHz = Marker 1 + Delta 2 - 5725MHz

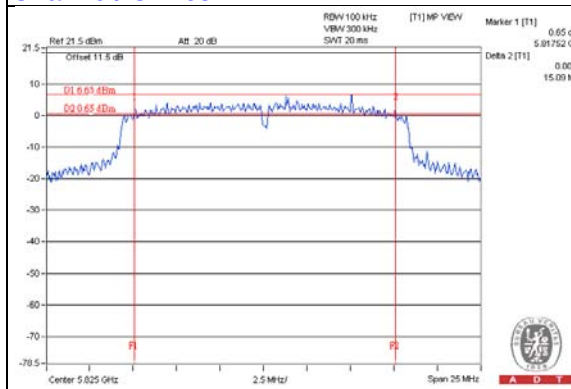
Chain 0 / CH149



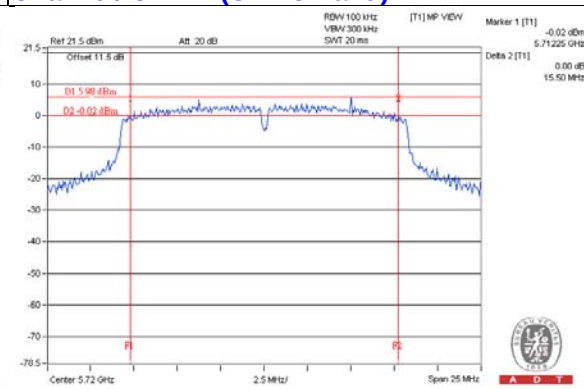
Chain 0 / CH157



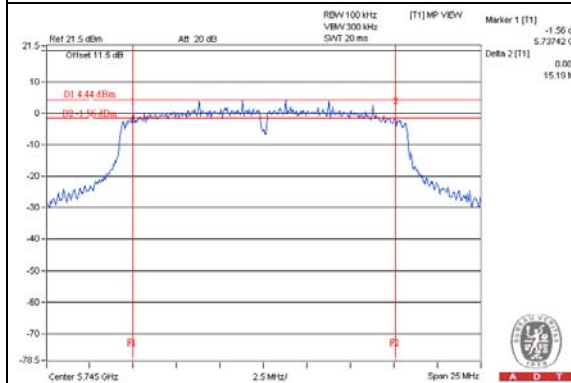
Chain 0 / CH165



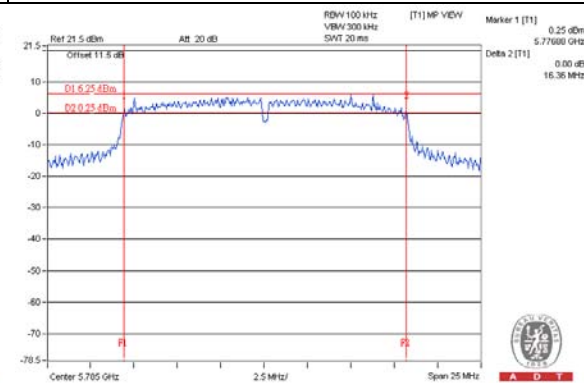
Chain 0 / CH144 (UNII-3 Band)



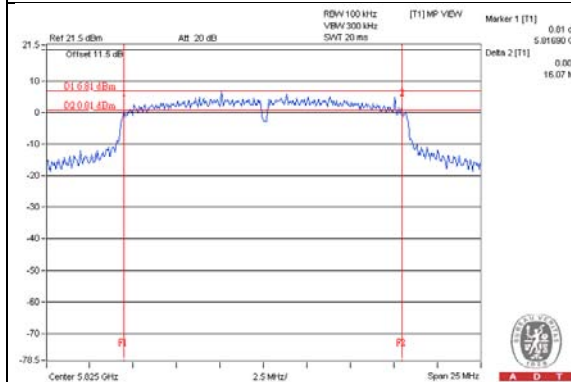
Chain 1 / CH149



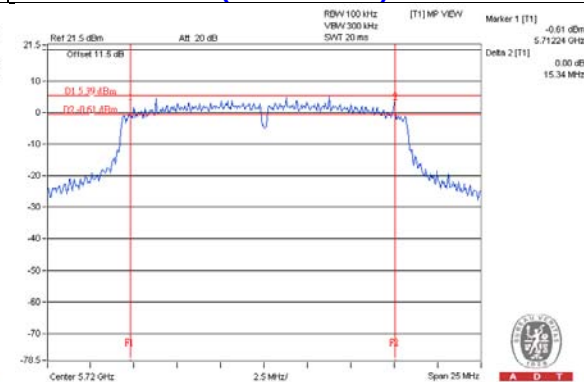
Chain 1 / CH157



Chain 1 / CH165



Chain 1 / CH144 (UNII-3 Band)



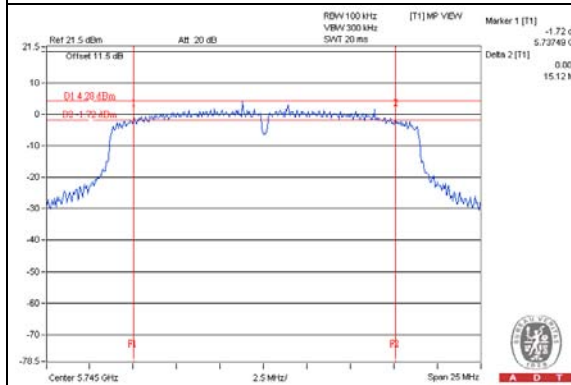
802.11ac (VHT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	15.12	15.45	0.5	Pass
157	5785	16.32	15.74	0.5	Pass
165	5825	13.46	15.06	0.5	Pass
144 (UNII-3 Band)	5720	2.55	2.56	0.5	Pass

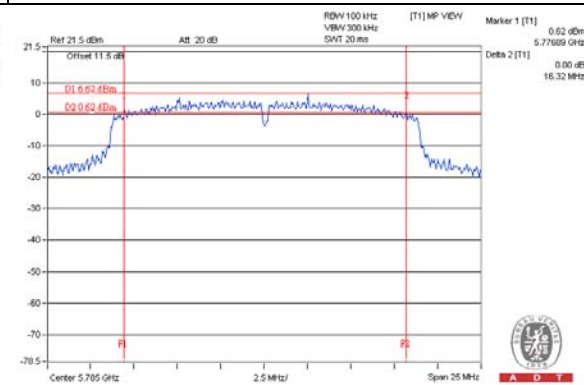
NOTE:

The 6dB bandwidth above 5725MHz = Marker 1 + Delta 2 - 5725MHz

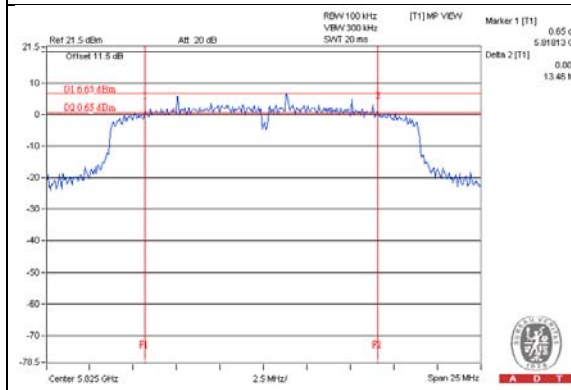
Chain 0 / CH149



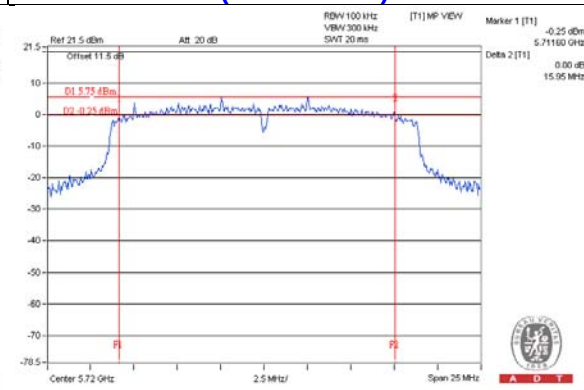
Chain 0 / CH157



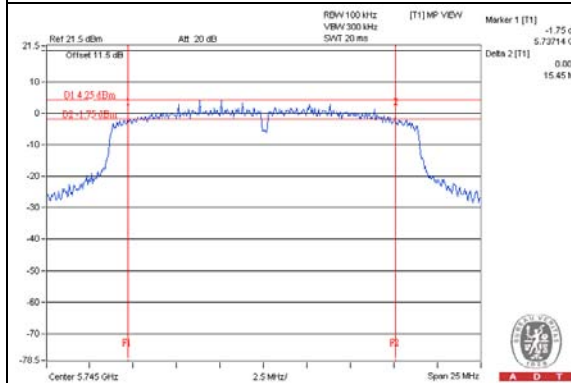
Chain 0 / CH165



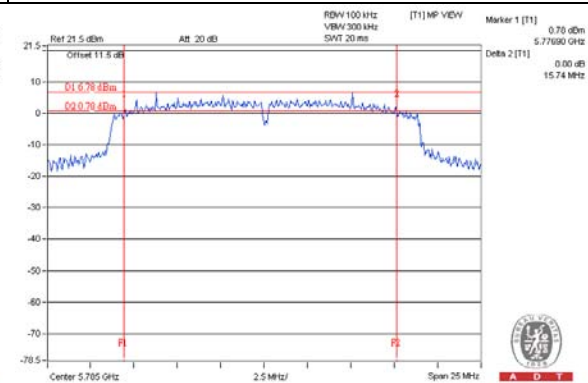
Chain 0 / CH144 (UNII-3 Band)



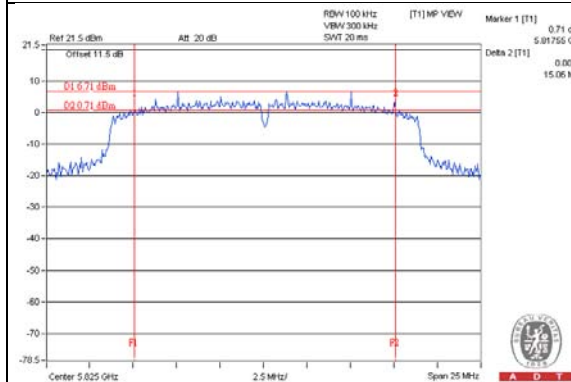
Chain 1 / CH149



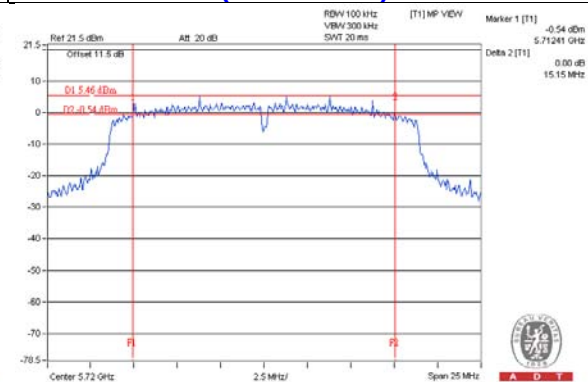
Chain 1 / CH157



Chain 1 / CH165



Chain 1 / CH144 (UNII-3 Band)



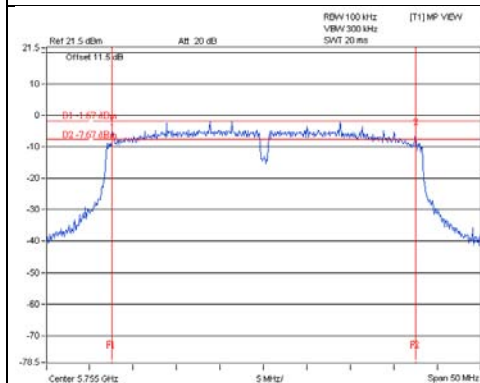
802.11ac (VHT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
151	5755	35.10	33.80	0.5	Pass
159	5795	32.02	33.92	0.5	Pass
142 (UNII-3 Band)	5710	2.65	2.51	0.5	Pass

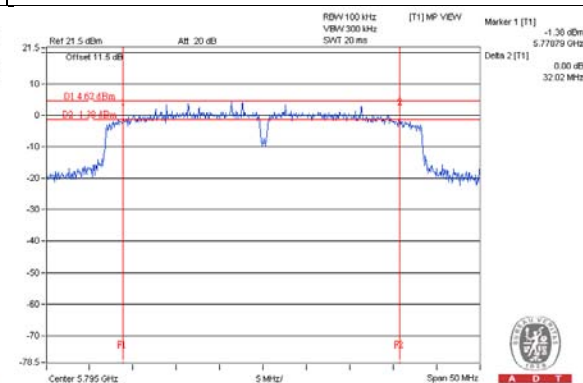
NOTE:

The 6dB bandwidth above 5725MHz = Marker 1 + Delta 2 - 5725MHz

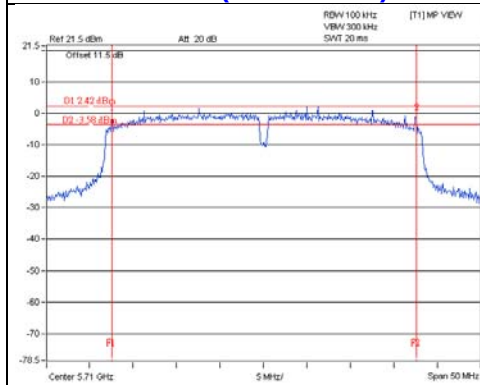
Chain 0 / CH151



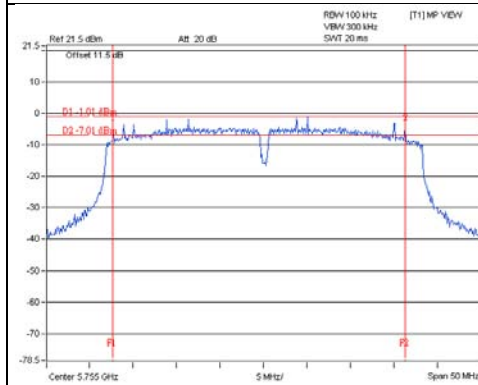
Chain 0 / CH159



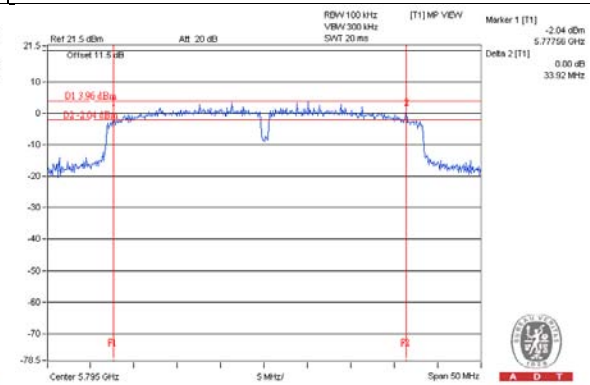
Chain 0 / CH142 (UNII-3 Band)



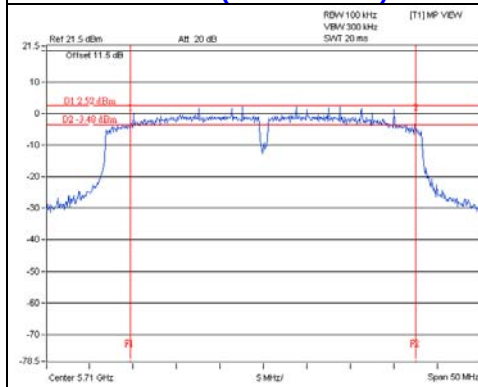
Chain 1 / CH151



Chain 1 / CH159



Chain 1 / CH142 (UNII-3 Band)



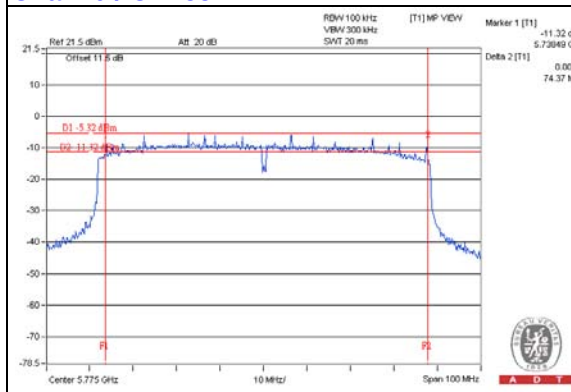
802.11ac (VHT80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
155	5775	74.37	72.94	0.5	Pass
138 (UNII-3 Band)	5690	2.68	2.65	0.5	Pass

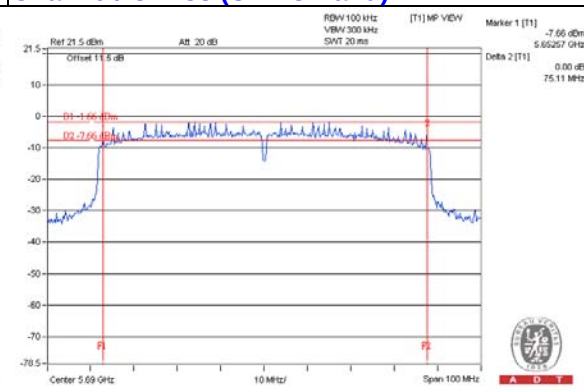
NOTE:

The 6dB bandwidth above 5725MHz = Marker 1 + Delta 2 - 5725MHz

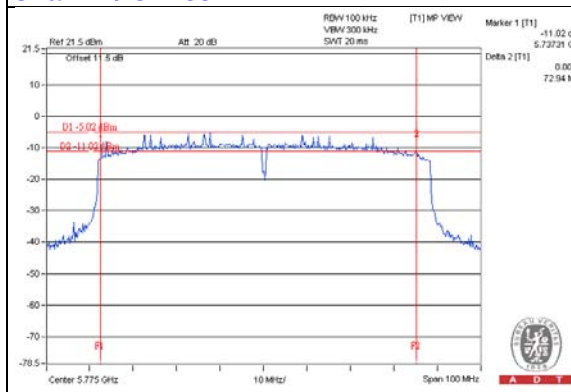
Chain 0 / CH155



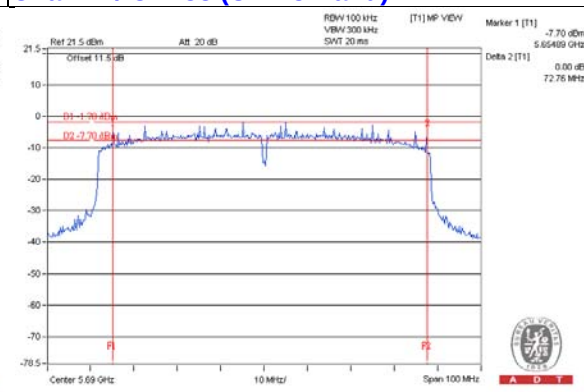
Chain 0 / CH138 (UNII-3 Band)



Chain 1 / CH155



Chain 1 / CH138 (UNII-3 Band)



4.4 Unwanted Emission (Radiated Versus Conducted)

4.4.1 Limits of Unwanted Emission Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table.

Frequencies (MHz)	Field Strength (microvolts/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

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

APPLICABLE TO	LIMIT	
789033 D02 General UNII Test Procedure New Rules v01	FIELD STRENGTH AT 3m	
	PK:74 (dBuV/m)	AV:54 (dBuV/m)
APPLICABLE TO	EIRP LIMIT	EQUIVALENT FIELD STRENGTH AT 3m
15.407(b)(1)	PK:-27 (dBm/MHz)	PK:68.2(dBuV/m)
15.407(b)(2)		
15.407(b)(3)		
15.407(b)(4)	PK:-27 (dBm/MHz) ^{*1} PK:-17 (dBm/MHz) ^{*2}	PK: 68.2(dBuV/m) ^{*1} PK:78.2 (dBuV/m) ^{*2}

NOTE: ^{*1} beyond 10MHz of the band edge ^{*2} within 10 MHz of band edge

The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3} \mu\text{V/m, where P is the eirp (Watts).}$$

4.4.2 Test Instruments

For Above 1GHz (Only for channel straddling 5725MHz):

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
MXE EMI Receiver Agilent	N9038A	MY51210105	July 21, 2014	July 20, 2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-03	Nov. 12, 2014	Nov. 11, 2015
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Feb. 26, 2014	Feb. 25, 2015
RF Cable	NA	CHGCAB_001	Oct. 04, 2014	Oct. 03, 2015
Horn_Antenna AISI	AIH.8018	0000320091110	Aug. 27, 2014	Aug. 26, 2015
Pre-Amplifier Agilent	8449B	3008A02578	June 24, 2014	June 23, 2015
RF Cable	NA	131205 131214 SNMY23684/4	Jan. 16, 2015	Jan. 15, 2016
Spectrum Analyzer R&S	FSV40	100964	July 05, 2014	July 04, 2015
Pre-Amplifier EMCI	EMC184045	980143	Jan. 16, 2015	Jan. 15, 2016
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Aug. 26, 2014	Aug. 25, 2015
RF Cable	NA	RF104-121 RF104-204	Dec. 11, 2014	Dec. 10, 2015
Antenna Tower & Turn Table CT	NA	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in 966 Chamber No. G.
4. The FCC Site Registration No. is 966073.
5. The VCCI Site Registration No. is G-137.
6. The CANADA Site Registration No. is IC 7450H-2.
7. Tested Date: Feb. 06 to 11, 2015

For above 1GHz test (other channels):

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY51210105	July 24, 2015	July 23, 2016
Horn_Antenna AISI	AIH.8018	000032009111 0	Feb. 09, 2015	Feb. 08, 2016
Pre-Amplifier Agilent	8449B	3008A02578	June 23, 2015	June 22, 2016
RF Cable	NA	131205 131216 131217 SNMY23684/ 4	Jan. 16, 2015	Jan. 15, 2016
Spectrum Analyzer R&S	FSV40	100964	June 26, 2015	June 25, 2016
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Dec. 12, 2014	Dec. 11, 2015
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Feb. 05, 2015	Feb. 04, 2016
RF Cable	NA	329751/4 RF104-204	Dec. 11, 2014	Dec. 10, 2015
Software	ADT_Radiated _V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. G.
3. The FCC Site Registration No. is 966073.
4. The VCCI Site Registration No. is G-137.
5. The CANADA Site Registration No. is IC 7450H-2.
6. Tested Date: Sep. 23, 2015

For below 1GHz test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY51210202	Dec. 12, 2014	Dec. 11, 2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-04	Nov. 12, 2014	Nov. 11, 2015
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Feb. 09, 2015	Feb. 08, 2016
RF Cable	8D-FB	CHHCAB-001-1 CHHCAB-001-2	Oct. 05, 2014	Oct. 04, 2015
	RF-141	CHHCAB-004	Oct. 05, 2014	Oct. 04, 2015
Software	ADT_Radiated _V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. H.
3. The FCC Site Registration No. is 797305.
4. The CANADA Site Registration No. is IC 7450H-3.
5. Tested Date: Sep. 23, 2015

4.4.3 Test Procedure

Following FCC KDB 789033 D02 General UNII Test Procedures:

Radiated versus Conducted Measurements.

The unwanted emission limits in both the restricted and non-restricted bands are based on antenna-port conducted measurements in conjunction with cabinet emissions tests are permitted to demonstrate compliance.

The following steps was performed:

- a. Cabinet emissions measurements. Radiated measurement was performed to ensure that cabinet emissions are below the emission limits. For the cabinet-emission measurements the antenna was replaced by a termination matching the nominal impedance of the antenna.
- b. Conducted tests was performed using equipment that matches the nominal impedance of the antenna assembly used with the EUT
- c. EIRP calculation. A value representative of an upper bound on out-of-band antenna gain (in dBi) shall be added to the measured antenna-port conducted emission power to compute EIRP within the specified measurement bandwidth. (For emissions in the restricted bands, additional calculations are required to convert EIRP to field strength at the specified distance.) The upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands or 2 dBi, whichever is greater
- d. EIRP adjustments for multiple outputs. (Follow the procedures specified in FCC KDB Publication 662911)
- e. For all of Radiation emission test
 - e-1. The EUT was placed on the top of a rotating table 0.8 meters (for below 1GHz) / 1.5 meters (for above 1GHz) above the ground at a 3 meters chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
 - e-2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
 - e-3. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
 - e-4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
 - e-5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
 - e-6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle $< 98\%$) or 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

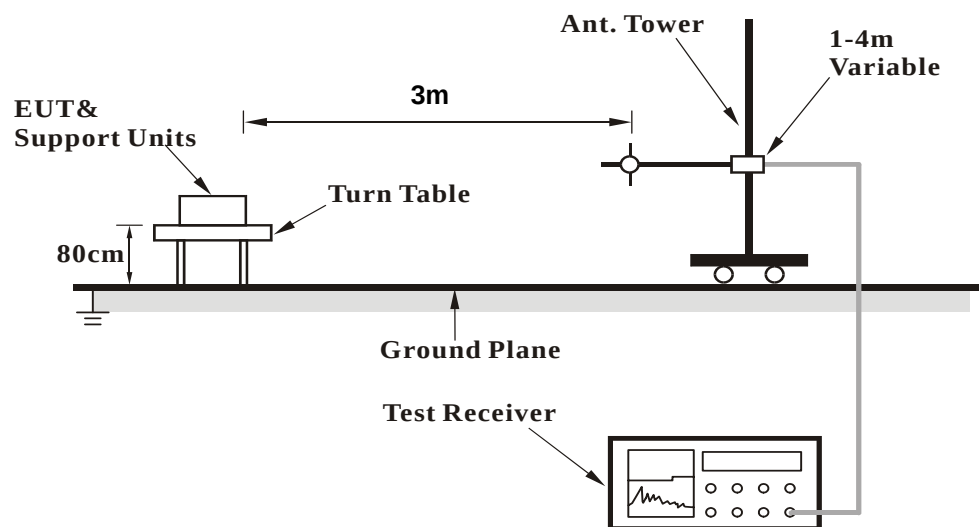
4.4.4 Deviation from Test Standard

No deviation.

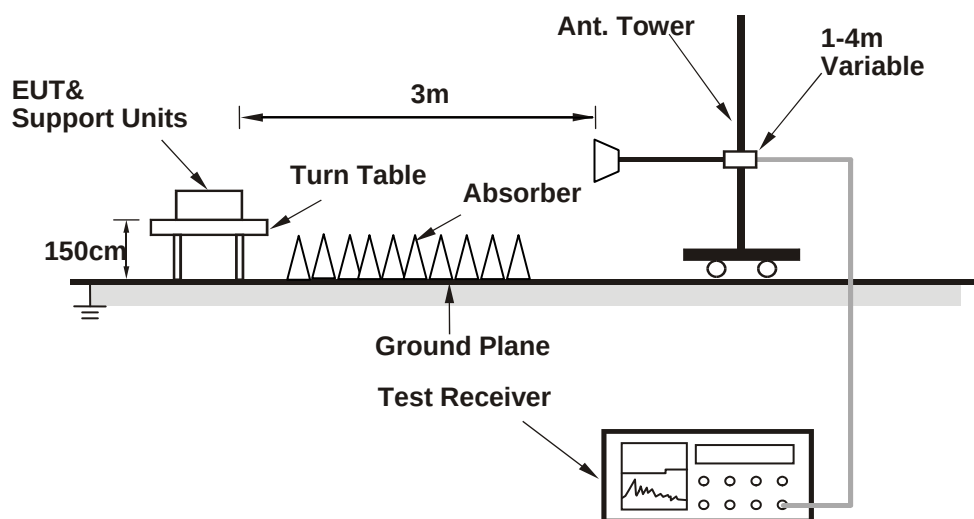
4.4.5 Test Setup

For radiated configuration:

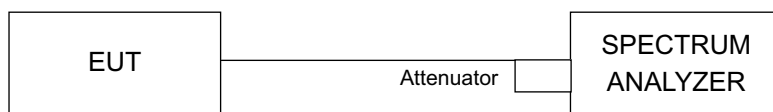
<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



For conducted configuration:



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.4.6 EUT Operating Condition

1. Connect the EUT with the support unit A (Notebook Computer) which is placed on a testing table.
2. The communication partner run test program "QRCT Version: 3.0.33.0" to enable EUT under transmission/receiving condition continuously at specific channel frequency.

4.4.7 Test Results (Radiated Measurement)

Radiated versus Conducted Measurement	
☐ Conducted measurement	☒ Radiated measurement
<u>For Radiated measurement:</u> The level of unwanted emissions was measured when radiated by the cabinet or structure of the equipment with the antenna connector(s) terminated by a specified load (cabinet radiation) <u>For Conducted measurement:</u> The level of unwanted emissions was measured as their power in a specified load (conducted spurious emissions).	

Radiated test was done with 50ohm terminator on antenna port

Above 1GHz Data :

802.11a

CHANNEL	TX Channel 144	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	11440.00	56.3 PK	74.0	-17.7	1.00 H	207	41.91	14.39
2	11440.00	42.4 AV	54.0	-11.6	1.00 H	207	28.01	14.39
3	#17160.00	60.7 PK	74.0	-13.3	1.00 H	56	38.69	22.01
4	#17160.00	47.9 AV	54.0	-6.1	1.00 H	56	25.89	22.01
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	11440.00	56.1 PK	74.0	-17.9	1.04 V	83	41.71	14.39
2	11440.00	42.5 AV	54.0	-11.5	1.04 V	83	28.11	14.39
3	#17160.00	61.1 PK	74.0	-12.9	1.00 V	98	39.09	22.01
4	#17160.00	47.5 AV	54.0	-6.5	1.00 V	98	25.49	22.01

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 149	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	11490.00	56.3 PK	74.0	-17.7	1.05 H	211	39.58	16.72
2	11490.00	42.8 AV	54.0	-11.2	1.05 H	211	26.08	16.72
3	#17235.00	60.2 PK	74.0	-13.8	1.01 H	58	34.35	25.85
4	#17235.00	47.3 AV	54.0	-6.7	1.01 H	58	21.45	25.85
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	11490.00	55.5 PK	74.0	-18.5	1.02 V	94	38.78	16.72
2	11490.00	42.3 AV	54.0	-11.7	1.02 V	94	25.58	16.72
3	#17235.00	61.1 PK	74.0	-12.9	1.04 V	99	35.25	25.85
4	#17235.00	47.7 AV	54.0	-6.3	1.04 V	99	21.85	25.85

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 157	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	11570.00	57.8 PK	74.0	-16.2	1.01 H	209	40.58	17.22
2	11570.00	43.4 AV	54.0	-10.6	1.01 H	209	26.18	17.22
3	#17355.00	60.9 PK	74.0	-13.1	1.03 H	56	34.75	26.15
4	#17355.00	48.1 AV	54.0	-5.9	1.03 H	56	21.95	26.15
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	11570.00	56.5 PK	74.0	-17.5	1.05 V	107	39.28	17.22
2	11570.00	42.9 AV	54.0	-11.1	1.05 V	107	25.68	17.22
3	#17355.00	61.4 PK	74.0	-12.6	1.10 V	93	35.25	26.15
4	#17355.00	47.6 AV	54.0	-6.4	1.10 V	93	21.45	26.15

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 165	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	11650.00	56.2 PK	74.0	-17.8	1.06 H	214	38.73	17.47
2	11650.00	42.4 AV	54.0	-11.6	1.06 H	214	24.93	17.47
3	#17475.00	60.2 PK	74.0	-13.8	1.05 H	48	33.31	26.89
4	#17475.00	47.3 AV	54.0	-6.7	1.05 H	48	20.41	26.89
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	11650.00	55.8 PK	74.0	-18.2	1.02 V	124	38.33	17.47
2	11650.00	42.7 AV	54.0	-11.3	1.02 V	124	25.23	17.47
3	#17475.00	61.0 PK	74.0	-13.0	1.00 V	88	34.11	26.89
4	#17475.00	47.6 AV	54.0	-6.4	1.00 V	88	20.71	26.89

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " # ": The radiated frequency is out of the restricted band.

802.11ac (VHT20)

CHANNEL	TX Channel 144	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	11440.00	56.9 PK	74.0	-17.1	1.00 H	201	42.51	14.39
2	11440.00	42.8 AV	54.0	-11.2	1.00 H	201	28.41	14.39
3	#17160.00	60.5 PK	74.0	-13.5	1.04 H	54	38.49	22.01
4	#17160.00	47.6 AV	54.0	-6.4	1.04 H	54	25.59	22.01
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	11440.00	56.5 PK	74.0	-17.5	1.03 V	123	42.11	14.39
2	11440.00	43.2 AV	54.0	-10.8	1.03 V	123	28.81	14.39
3	#17160.00	61.7 PK	74.0	-12.3	1.00 V	98	39.69	22.01
4	#17160.00	47.8 AV	54.0	-6.2	1.00 V	98	25.79	22.01

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 149	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	11490.00	56.5 PK	74.0	-17.5	1.06 H	212	39.78	16.72
2	11490.00	42.9 AV	54.0	-11.1	1.06 H	212	26.18	16.72
3	#17235.00	61.4 PK	74.0	-12.6	1.04 H	83	35.55	25.85
4	#17235.00	48.0 AV	54.0	-6.0	1.04 H	83	22.15	25.85
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	11490.00	56.5 PK	74.0	-17.5	1.10 V	83	39.78	16.72
2	11490.00	42.7 AV	54.0	-11.3	1.10 V	83	25.98	16.72
3	#17235.00	61.2 PK	74.0	-12.8	1.01 V	82	35.35	25.85
4	#17235.00	48.0 AV	54.0	-6.0	1.01 V	82	22.15	25.85

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 157	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	11570.00	57.2 PK	74.0	-16.8	1.05 H	202	39.98	17.22
2	11570.00	43.0 AV	54.0	-11.0	1.05 H	202	25.78	17.22
3	#17355.00	60.3 PK	74.0	-13.7	1.04 H	68	34.15	26.15
4	#17355.00	47.3 AV	54.0	-6.7	1.04 H	68	21.15	26.15
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	11570.00	55.5 PK	74.0	-18.5	1.05 V	88	38.28	17.22
2	11570.00	42.7 AV	54.0	-11.3	1.05 V	88	25.48	17.22
3	#17355.00	60.7 PK	74.0	-13.3	1.06 V	112	34.55	26.15
4	#17355.00	47.4 AV	54.0	-6.6	1.06 V	112	21.25	26.15

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 165	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	11650.00	57.0 PK	74.0	-17.0	1.06 H	222	39.53	17.47
2	11650.00	43.5 AV	54.0	-10.5	1.06 H	222	26.03	17.47
3	#17475.00	60.4 PK	74.0	-13.6	1.01 H	49	33.51	26.89
4	#17475.00	47.5 AV	54.0	-6.5	1.01 H	49	20.61	26.89
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	11650.00	55.9 PK	74.0	-18.1	1.05 V	90	38.43	17.47
2	11650.00	43.0 AV	54.0	-11.0	1.05 V	90	25.53	17.47
3	#17475.00	61.4 PK	74.0	-12.6	1.07 V	111	34.51	26.89
4	#17475.00	47.8 AV	54.0	-6.2	1.07 V	111	20.91	26.89

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " # ": The radiated frequency is out of the restricted band.

802.11ac (VHT40)

CHANNEL	TX Channel 142	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	11420.00	56.6 PK	74.0	-17.4	1.03 H	209	42.19	14.41
2	11420.00	42.6 AV	54.0	-11.4	1.03 H	209	28.19	14.41
3	#17130.00	61.1 PK	74.0	-12.9	1.01 H	78	39.21	21.89
4	#17130.00	48.0 AV	54.0	-6.0	1.01 H	78	26.11	21.89
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	11420.00	56.0 PK	74.0	-18.0	1.00 V	96	41.59	14.41
2	11420.00	43.1 AV	54.0	-10.9	1.00 V	96	28.69	14.41
3	#17130.00	61.4 PK	74.0	-12.6	1.00 V	78	39.51	21.89
4	#17130.00	47.7 AV	54.0	-6.3	1.00 V	78	25.81	21.89

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 151	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	11510.00	56.5 PK	74.0	-17.5	1.00 H	183	39.77	16.73
2	11510.00	42.8 AV	54.0	-11.2	1.00 H	183	26.07	16.73
3	#17265.00	60.0 PK	74.0	-14.0	1.09 H	53	34.25	25.75
4	#17265.00	47.1 AV	54.0	-6.9	1.09 H	53	21.35	25.75
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	11510.00	56.0 PK	74.0	-18.0	1.00 V	104	39.27	16.73
2	11510.00	42.4 AV	54.0	-11.6	1.00 V	104	25.67	16.73
3	#17265.00	60.2 PK	74.0	-13.8	1.03 V	106	34.45	25.75
4	#17265.00	47.1 AV	54.0	-6.9	1.03 V	106	21.35	25.75

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 159	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	11590.00	57.3 PK	74.0	-16.7	1.03 H	207	39.93	17.37
2	11590.00	43.1 AV	54.0	-10.9	1.03 H	207	25.73	17.37
3	#17385.00	60.6 PK	74.0	-13.4	1.05 H	45	34.16	26.44
4	#17385.00	47.7 AV	54.0	-6.3	1.05 H	45	21.26	26.44
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	11590.00	55.7 PK	74.0	-18.3	1.00 V	94	38.33	17.37
2	11590.00	42.5 AV	54.0	-11.5	1.00 V	94	25.13	17.37
3	#17385.00	61.3 PK	74.0	-12.7	1.06 V	100	34.86	26.44
4	#17385.00	48.1 AV	54.0	-5.9	1.06 V	100	21.66	26.44

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " # ": The radiated frequency is out of the restricted band.

802.11ac (VHT80)

CHANNEL	TX Channel 138	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	11380.00	57.1 PK	74.0	-16.9	1.00 H	194	42.71	14.39
2	11380.00	42.6 AV	54.0	-11.4	1.00 H	194	28.21	14.39
3	#17070.00	60.8 PK	74.0	-13.2	1.00 H	58	39.11	21.69
4	#17070.00	47.4 AV	54.0	-6.6	1.00 H	58	25.71	21.69
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	11380.00	55.3 PK	74.0	-18.7	1.01 V	116	40.91	14.39
2	11380.00	42.3 AV	54.0	-11.7	1.01 V	116	27.91	14.39
3	#17070.00	61.7 PK	74.0	-12.3	1.00 V	107	40.01	21.69
4	#17070.00	47.8 AV	54.0	-6.2	1.00 V	107	26.11	21.69

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 155	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	11550.00	56.9 PK	74.0	-17.1	1.01 H	197	39.84	17.06
2	11550.00	42.9 AV	54.0	-11.1	1.01 H	197	25.84	17.06
3	#17325.00	60.2 PK	74.0	-13.8	1.06 H	75	34.33	25.87
4	#17325.00	47.5 AV	54.0	-6.5	1.06 H	75	21.63	25.87
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	11550.00	56.1 PK	74.0	-17.9	1.01 V	93	39.04	17.06
2	11550.00	42.7 AV	54.0	-11.3	1.01 V	93	25.64	17.06
3	#17325.00	62.0 PK	74.0	-12.0	1.05 V	95	36.13	25.87
4	#17325.00	48.6 AV	54.0	-5.4	1.05 V	95	22.73	25.87

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " # ": The radiated frequency is out of the restricted band.
6. The resolution bandwidth of test receiver is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) for Average detection (AV). Emission AV measured by RBW/VBW= 1MHz/300Hz

Below 1GHz Data

802.11ac (VHT40)

CHANNEL	TX Channel 159	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	Below 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	78.93	34.4 QP	40.0	-5.6	2.00 H	353	52.00	-17.59
2	166.02	40.4 QP	43.5	-3.1	1.73 H	74	53.63	-13.23
3	333.22	35.3 QP	46.0	-10.7	1.00 H	357	46.04	-10.77
4	473.53	38.0 QP	46.0	-8.0	1.00 H	33	45.80	-7.76
5	624.70	36.7 QP	46.0	-9.3	1.50 H	0	41.02	-4.34
6	797.12	37.7 QP	46.0	-8.3	1.00 H	46	39.20	-1.53
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	31.60	32.5 QP	40.0	-7.5	1.00 V	56	47.43	-14.89
2	81.13	30.9 QP	40.0	-9.1	1.00 V	334	48.99	-18.06
3	99.66	31.8 QP	43.5	-11.8	1.00 V	336	49.11	-17.36
4	266.63	33.7 QP	46.0	-12.3	1.00 V	34	46.95	-13.29
5	473.38	34.7 QP	46.0	-11.3	1.00 V	340	42.47	-7.77
6	797.07	34.7 QP	46.0	-11.3	1.00 V	308	36.22	-1.53

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

4.4.8 Test Results (Conducted Measurement)

Radiated versus Conducted Measurement	
☒ Conducted measurement	☐ Radiated measurement
<u>For Radiated measurement:</u> The level of unwanted emissions was measured when radiated by the cabinet or structure of the equipment with the antenna connector(s) terminated by a specified load (cabinet radiation) <u>For Conducted measurement:</u> The level of unwanted emissions was measured as their power in a specified load (conducted spurious emissions).	

Conducted Measurement Factor
a. The composite gain will be used when signal support the correlated signal. (Composite gain = $4.76\text{dBi} + 10\log(2) = 7.77\text{dBi}$) b. For the out of band spurious the gain for the specific band may have been used rather than the highest gain across all bands. c. For the band edge the gain for the specific band may have been used. d. In restricted bands below 1000 MHz, add upper bound on ground plane reflection: For $f = 30 - 1000$ MHz, add 4.7 dB. Note: The conducted emission test was considered some factor to compute test result.

Above 1GHz Data
802.11a - Channel 144

Conducted spurious emission table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	3800 PK	56.06	74	-17.94	-50.74	-49.33	7.77	-39.2
2	3796.875 AV	34.6	54	-19.4	-71.38	-71.5	7.77	-60.66
3	7618.75 PK	55.83	74	-18.17	-50.52	-49.93	7.77	-39.43
4	7628.125 AV	35.9	54	-18.1	-69.22	-71.32	7.77	-59.36
5	11450 PK	54.77	74	-19.23	-51.83	-50.78	7.77	-40.49
6	11446.875 AV	33.83	54	-20.17	-72.34	-72.08	7.77	-61.43
7	17154.125 PK	54.48	74	-19.52	-51.74	-51.39	7.77	-40.78
8	17145.5 AV	43.4	54	-10.6	-62.62	-62.67	7.77	-51.86

Note :

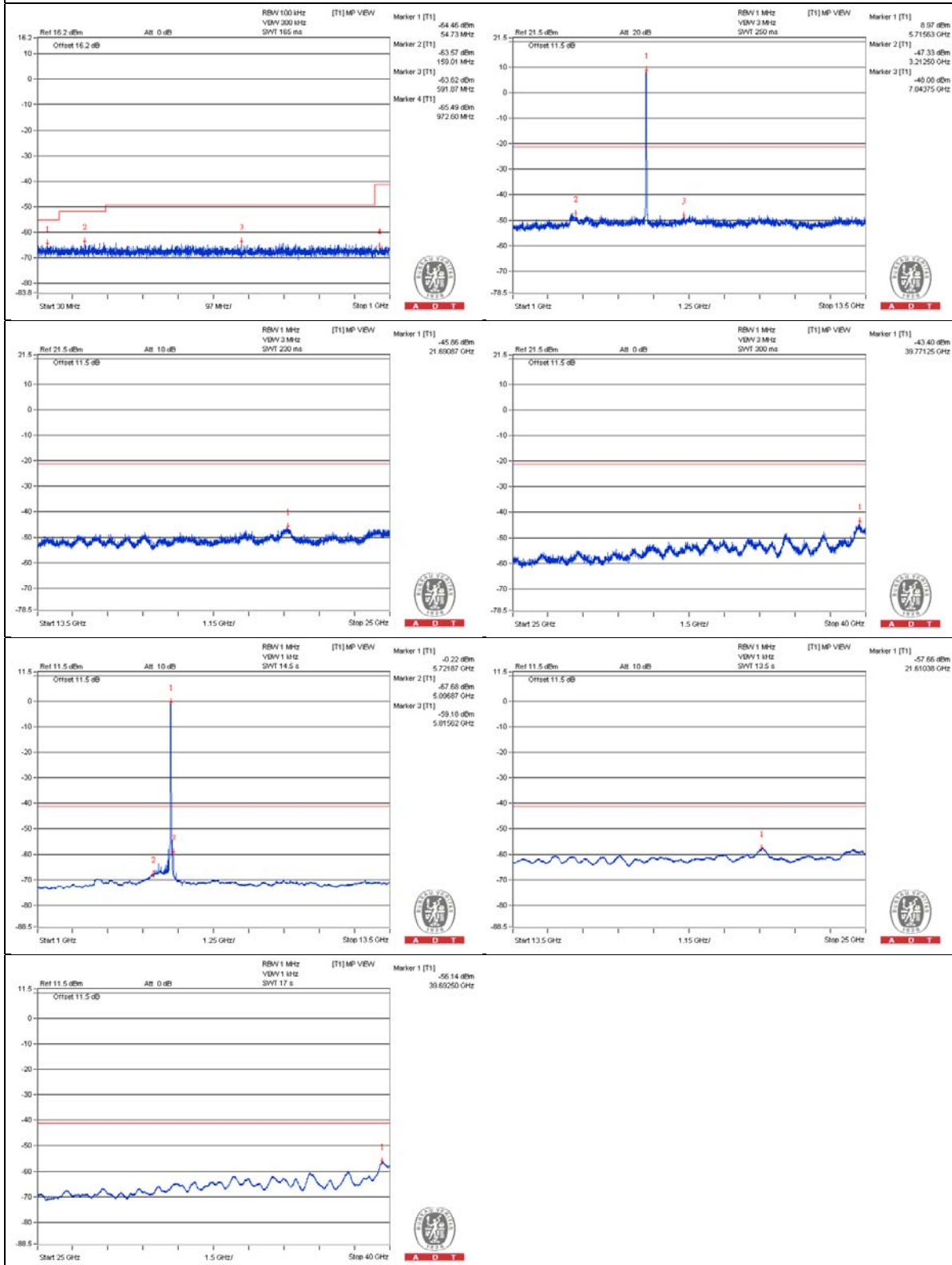
Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

Chain 0



Chain 1



Bandedge table

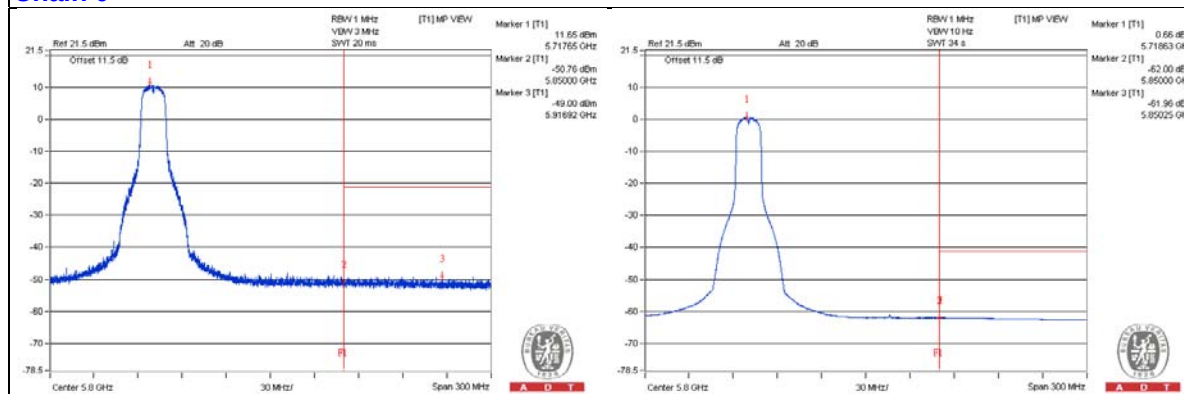
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	5848.075 PK	56.7	74	-17.3	-49.14	-49.55	7.77	-38.56
2	5912.05 AV	44.15	54	-9.85	-62.31	-61.5	7.77	-51.11

Note :

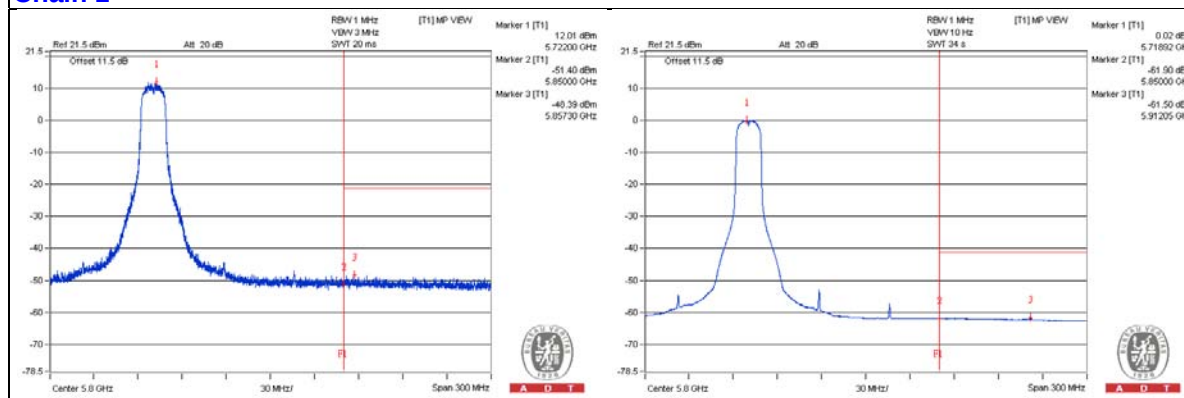
Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

Chain 0



Chain 1



802.11a - Channel 149

Conducted spurious emission table

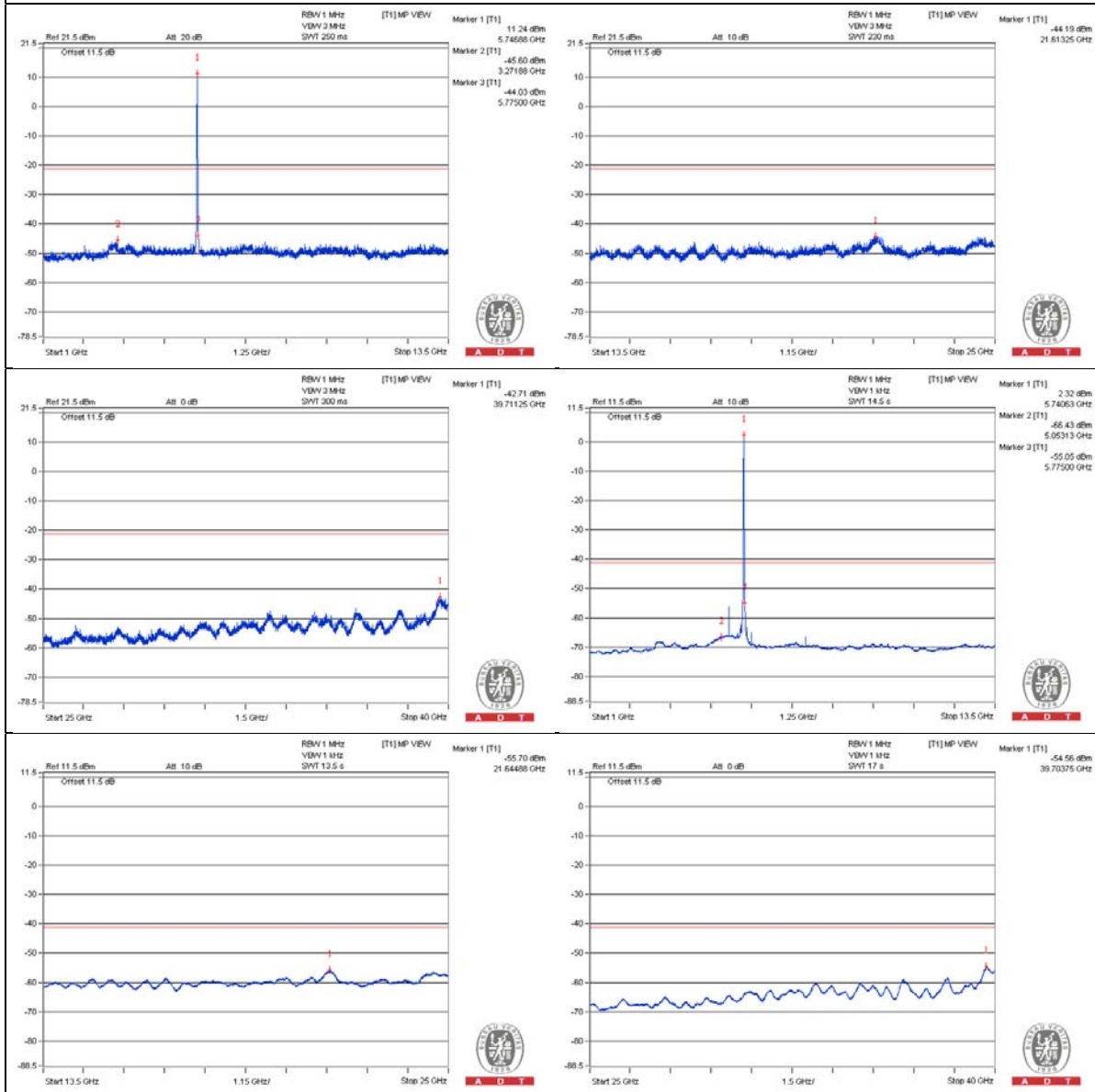
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	3831.25 PK	56.39	74	-17.61	-50.69	-48.81	7.77	-38.87
2	3828.125 AV	35.68	54	-18.32	-70.25	-70.48	7.77	-59.58
3	7659.375 PK	56.39	74	-17.61	-49.83	-49.47	7.77	-38.87
4	7659.375 AV	38.28	54	-15.72	-66.47	-69.61	7.77	-56.98
5	11490.625 PK	55.68	74	-18.32	-51.39	-49.53	7.77	-39.58
6	11490.625 AV	35.36	54	-18.64	-71.16	-70.24	7.77	-59.9
7	17234.625 PK	54.67	74	-19.33	-50.43	-52.57	7.77	-40.59
8	17234.625 AV	43.73	54	-10.27	-62.11	-62.51	7.77	-51.53

Note :

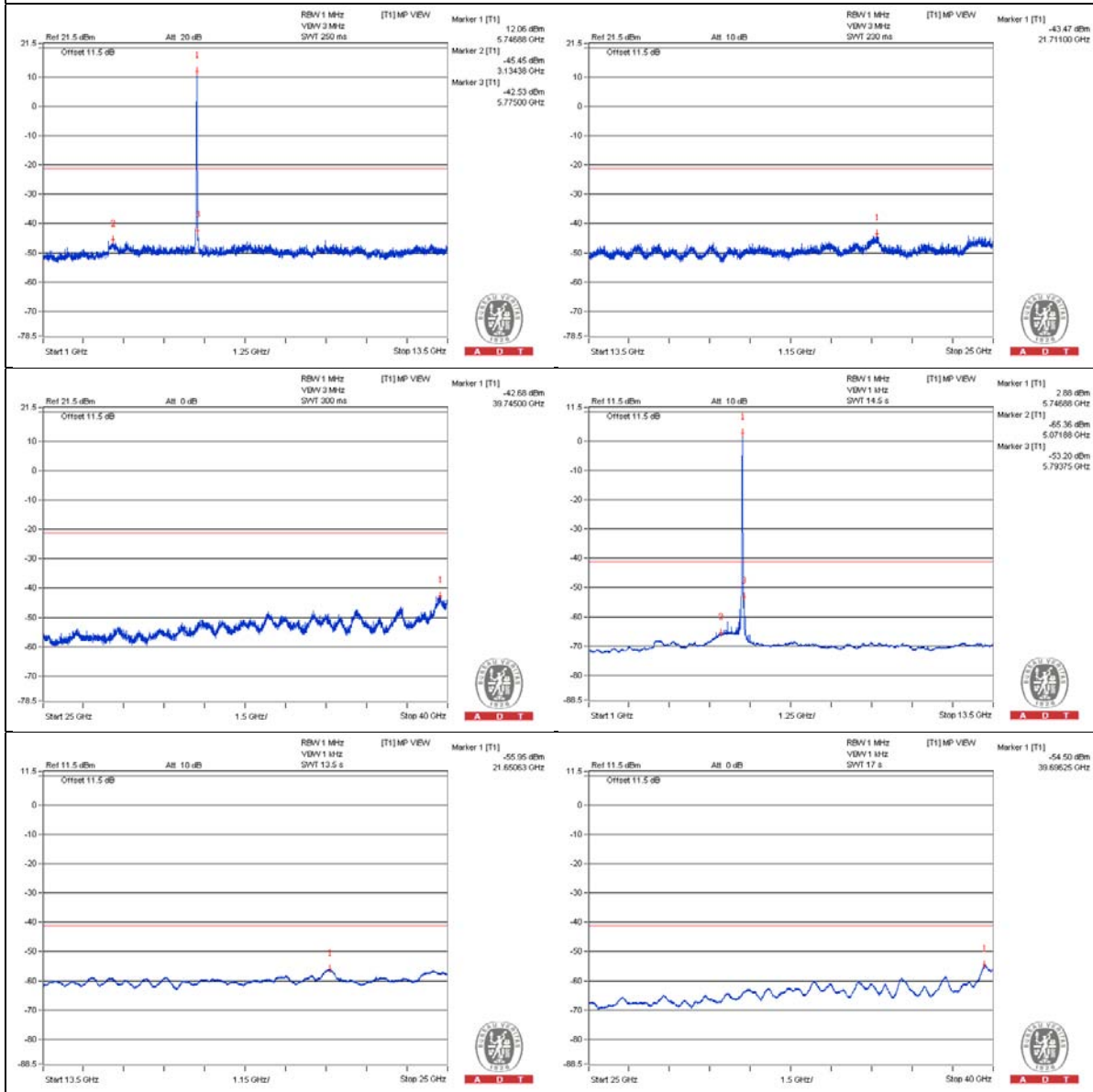
Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

Chain 0



Chain 1



Bandedge table

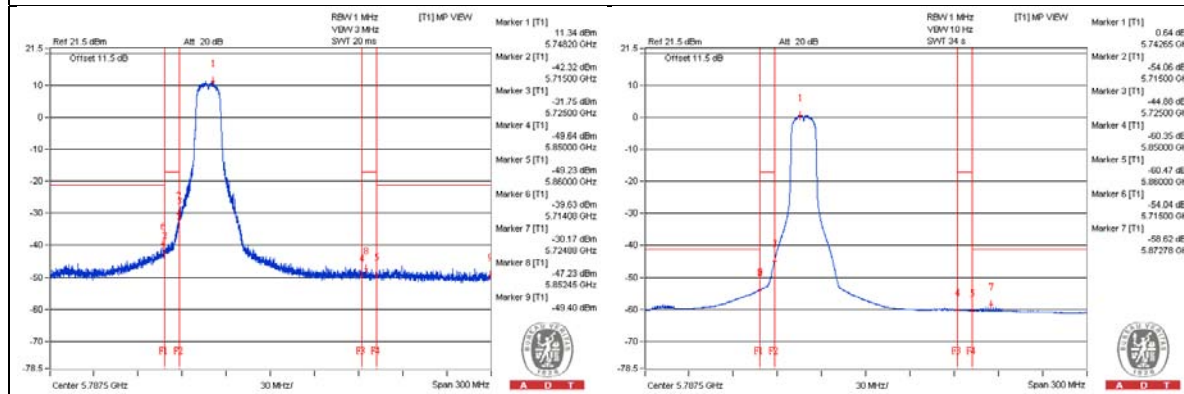
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	5712.575 PK	64.02	68.2	-4.18	-41.64	-42.43	7.77	-31.24
2	5724.875 PK	74.65	78.2	-3.55	-30.17	-33.09	7.77	-20.61

Note :

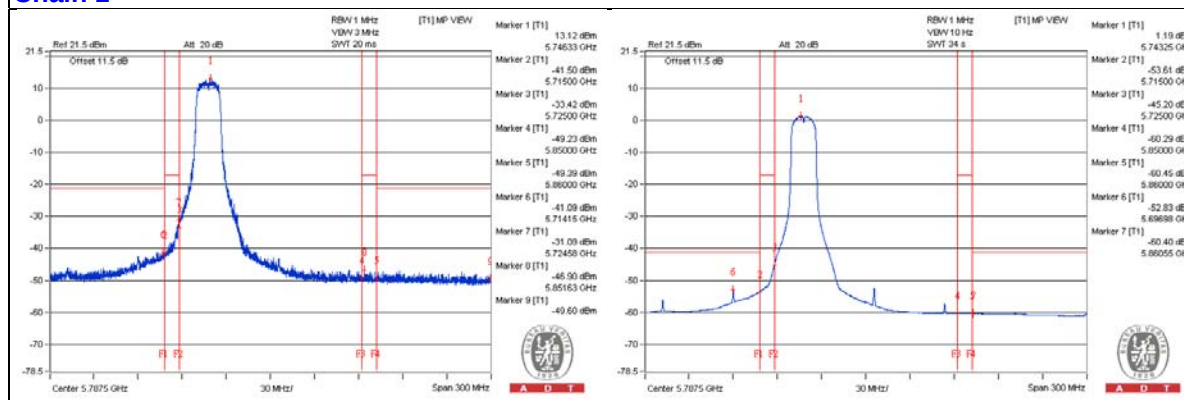
Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

Chain 0



Chain 1



802.11a - Channel 157

Conducted spurious emission table

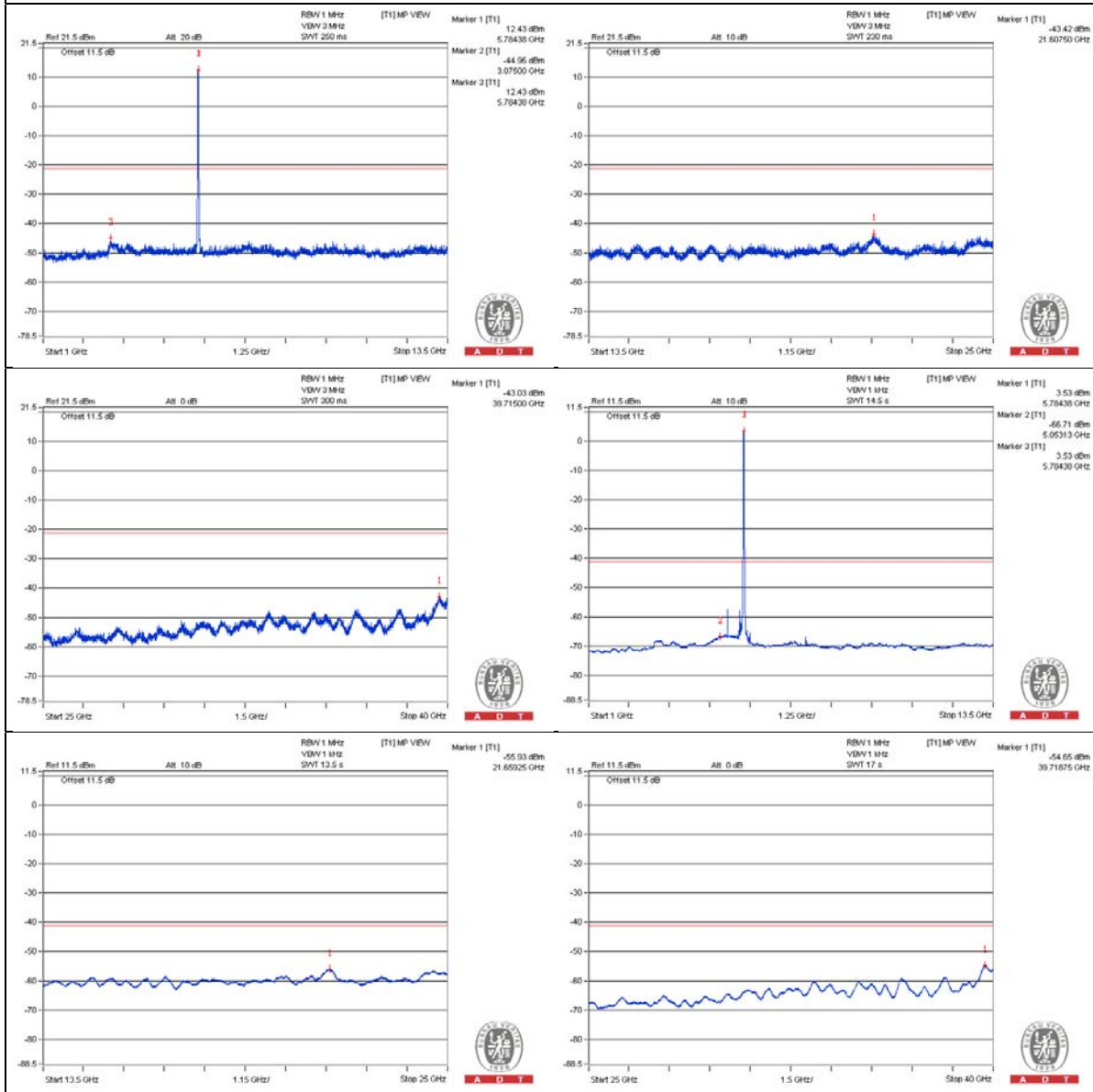
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	3856.25 PK	55.41	74	-18.59	-50.9	-50.37	7.77	-39.85
2	3856.25 AV	35.57	54	-18.43	-70.24	-70.72	7.77	-59.69
3	7712.5 PK	56.38	74	-17.62	-49.2	-50.18	7.77	-38.88
4	7712.5 AV	37.98	54	-16.02	-67.02	-69.43	7.77	-57.28
5	11568.75 PK	55.44	74	-18.56	-49.69	-51.75	7.77	-39.82
6	11571.875 AV	35.35	54	-18.65	-71.27	-70.18	7.77	-59.91
7	17355.375 PK	54.44	74	-19.56	-52	-51.23	7.77	-40.82
8	17355.375 AV	44.12	54	-9.88	-61.83	-62.02	7.77	-51.14

Note :

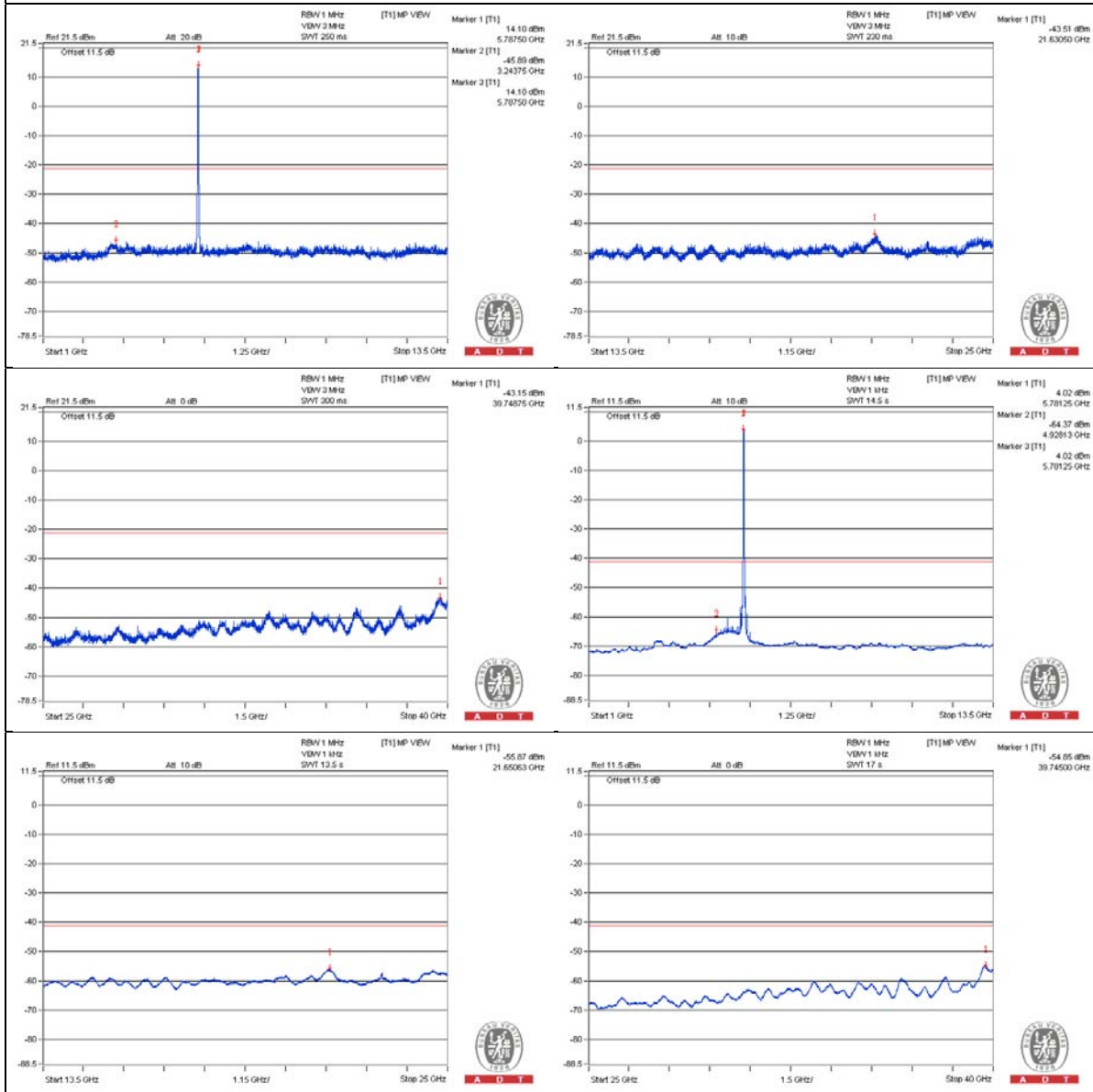
Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

Chain 0



Chain 1



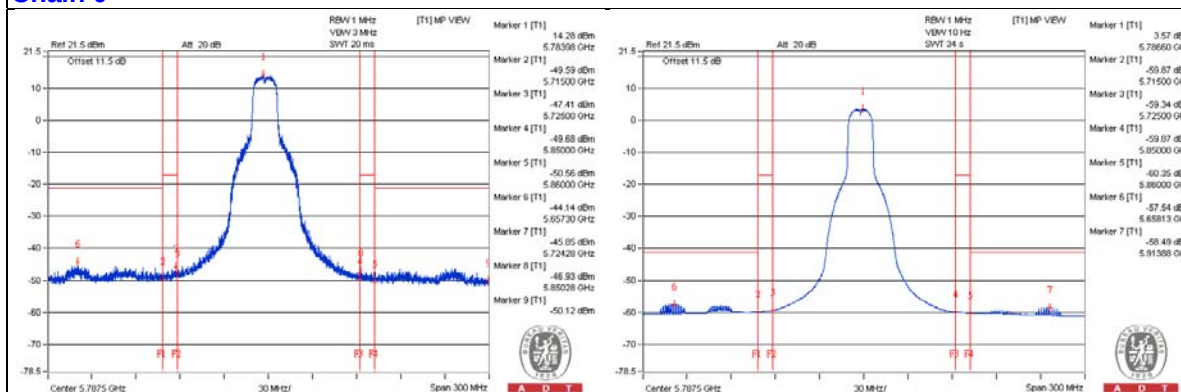
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	5712.725 PK	57.95	68.2	-10.25	-47.87	-48.32	7.77	-37.31
2	5724.275 PK	59.25	78.2	-18.95	-45.85	-47.99	7.77	-36.01
3	5854.25 PK	58.7	78.2	-19.5	-48.42	-46.47	7.77	-36.56
4	5860.325 PK	57.69	68.2	-10.51	-47.62	-49.22	7.77	-37.57

Note :

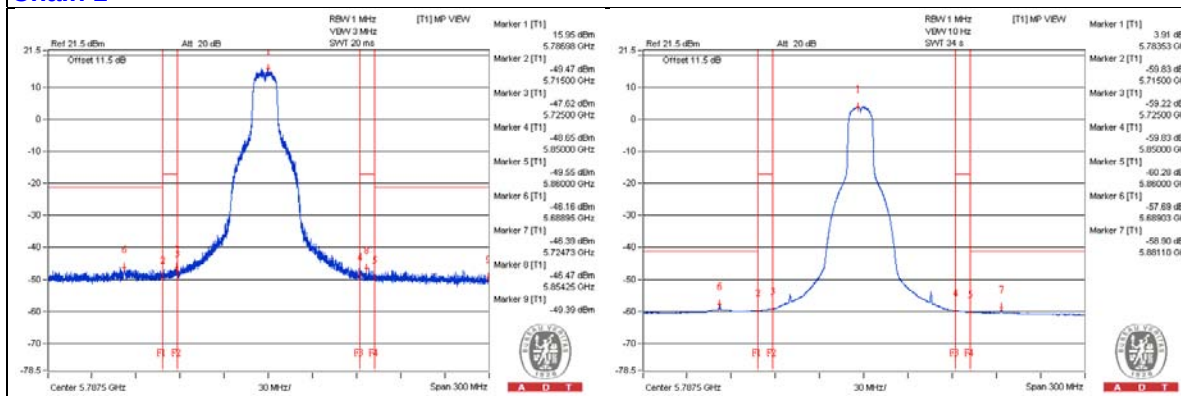
Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

Chain 0



Chain 1



802.11a - Channel 165

Conducted spurious emission table

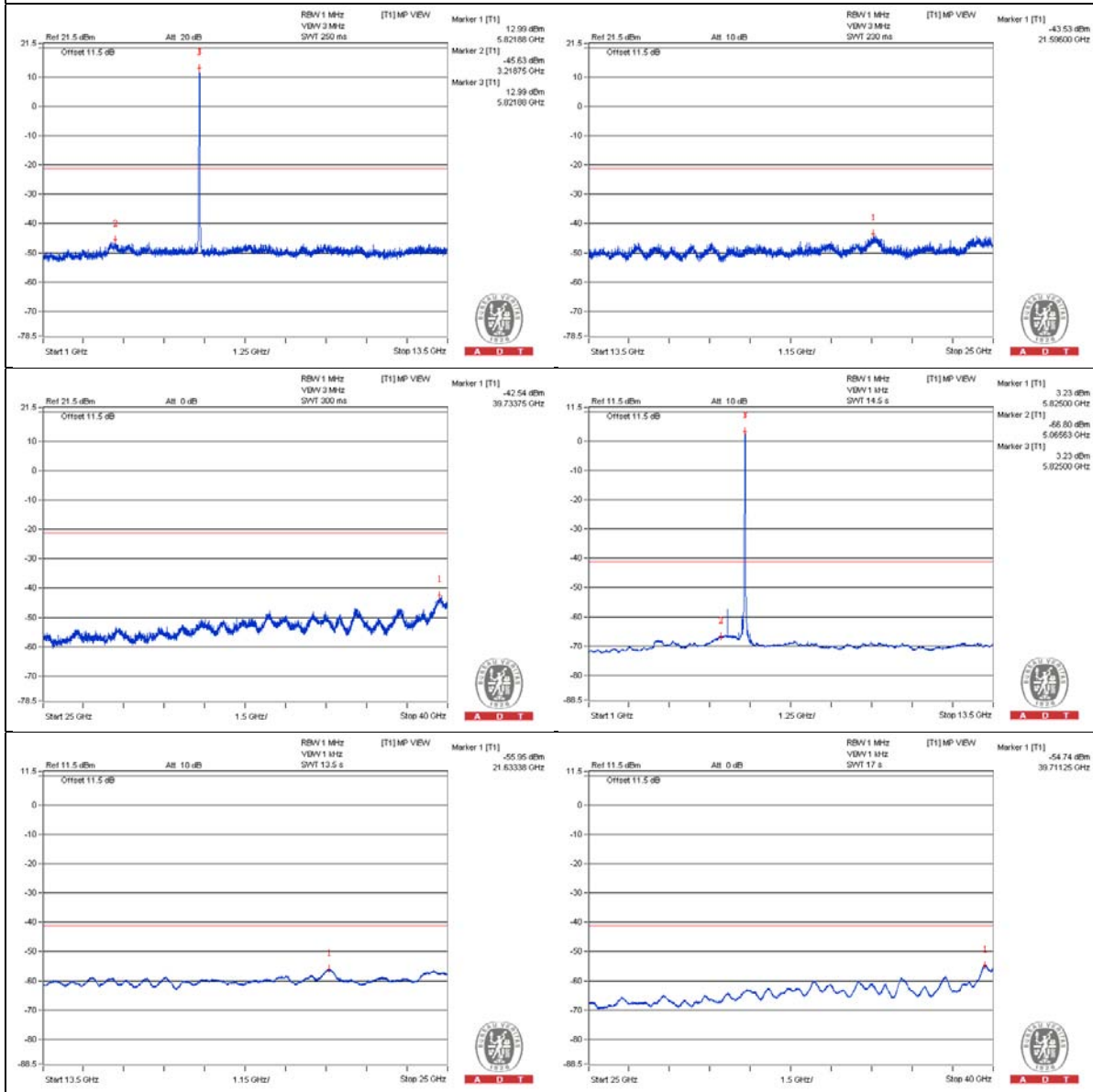
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	3884.375 PK	56.57	74	-17.43	-49.52	-49.43	7.77	-38.69
2	3884.375 AV	35.65	54	-18.35	-70.26	-70.52	7.77	-59.61
3	7765.625 PK	56.62	74	-17.38	-49.85	-49.03	7.77	-38.64
4	7765.625 AV	37.22	54	-16.78	-68.48	-69.2	7.77	-58.04
5	11650 PK	54.3	74	-19.7	-52.05	-51.46	7.77	-40.96
6	11650 AV	35.64	54	-18.36	-71.13	-69.77	7.77	-59.62
7	17476.125 PK	56.41	74	-17.59	-50.52	-48.9	7.77	-38.85
8	17473.25 AV	45.87	54	-8.13	-60.34	-60.01	7.77	-49.39

Note :

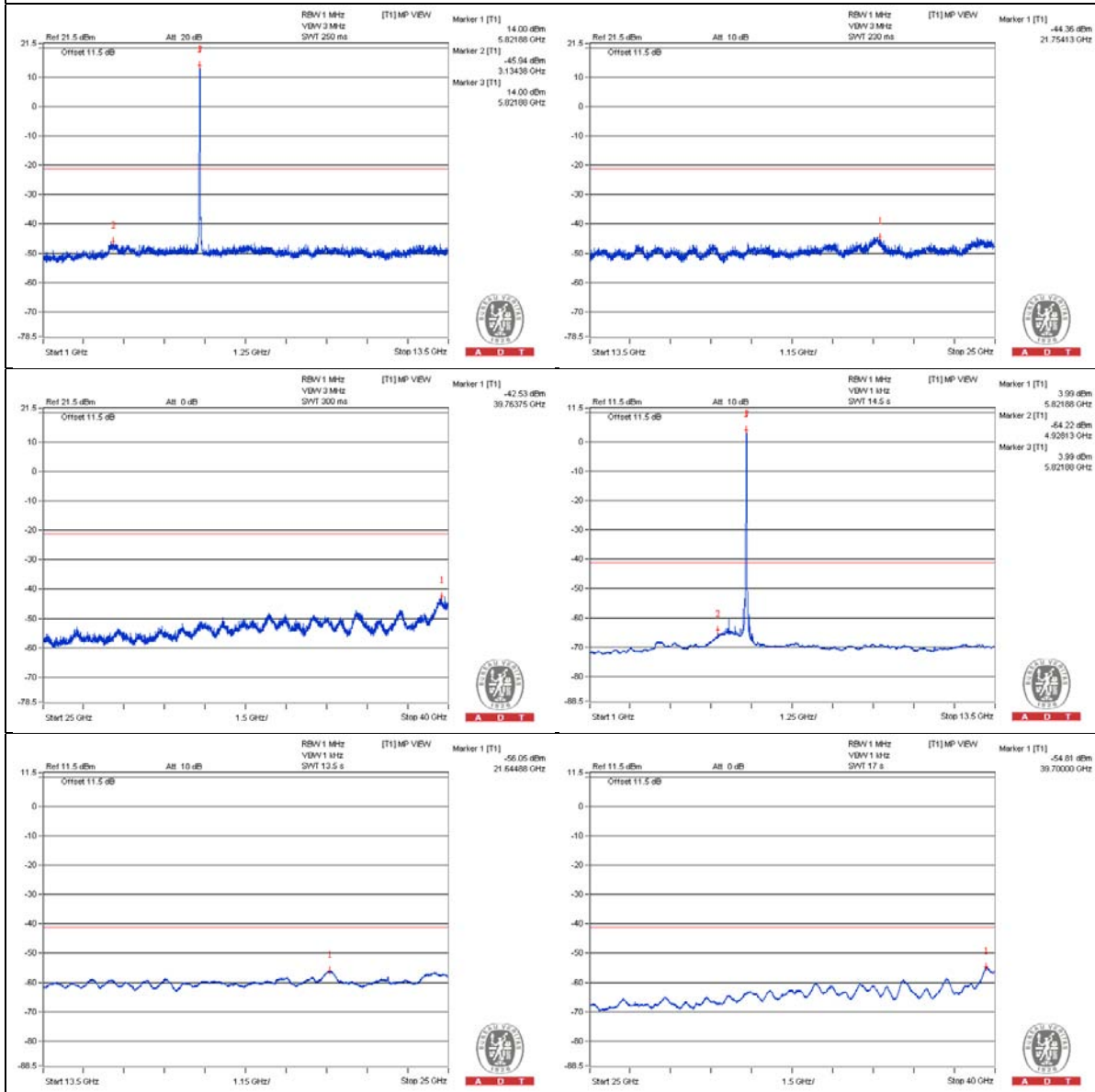
Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

Chain 0



Chain 1



Bandedge table

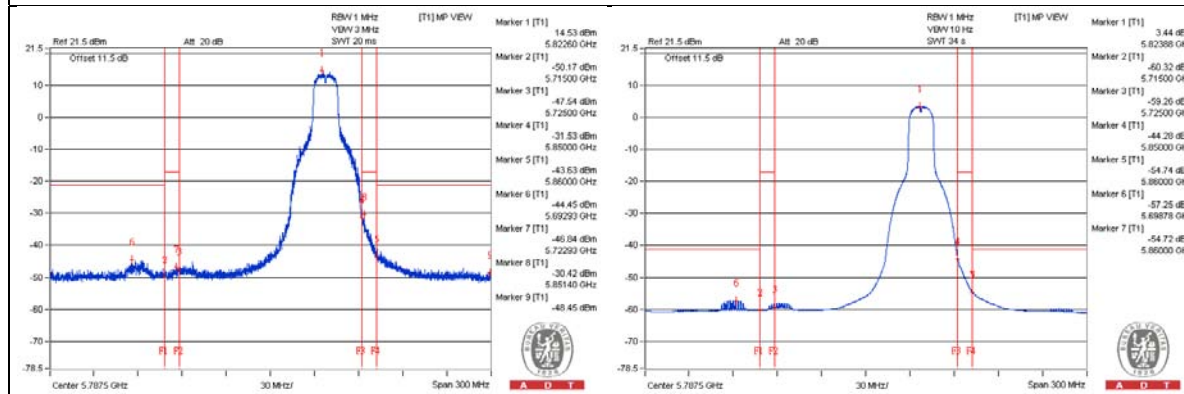
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	5851.4 PK	73.6	78.2	-4.6	-30.42	-36.35	7.77	-21.66
2	5866.85 PK	62.54	68.2	-5.66	-44.58	-42.64	7.77	-32.72

Note :

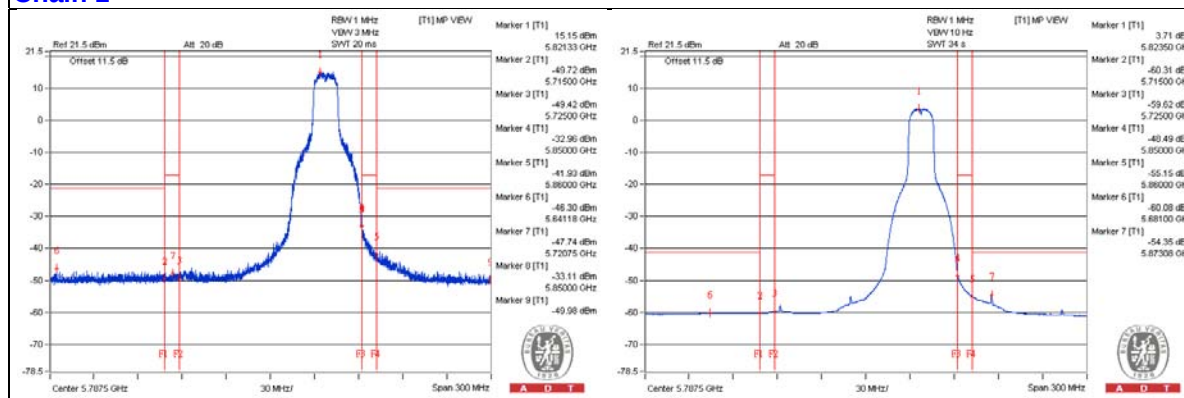
Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

Chain 0



Chain 1



802.11ac (VHT20) - Channel 144

Conducted spurious emission table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	3800 PK	55.65	74	-18.35	-51.35	-49.6	7.77	-39.61
2	3793.75 AV	34.55	54	-19.45	-71.43	-71.56	7.77	-60.71
3	7640.625 PK	56.23	74	-17.77	-48.89	-50.99	7.77	-39.03
4	7628.125 AV	35.83	54	-18.17	-69.29	-71.38	7.77	-59.43
5	11450 PK	55.27	74	-18.73	-50.13	-51.51	7.77	-39.99
6	11440.625 AV	33.77	54	-20.23	-72.5	-72.06	7.77	-61.49
7	17148.375 PK	54.25	74	-19.75	-51.8	-51.79	7.77	-41.01
8	17145.5 AV	43.33	54	-10.67	-62.76	-62.66	7.77	-51.93

Note :

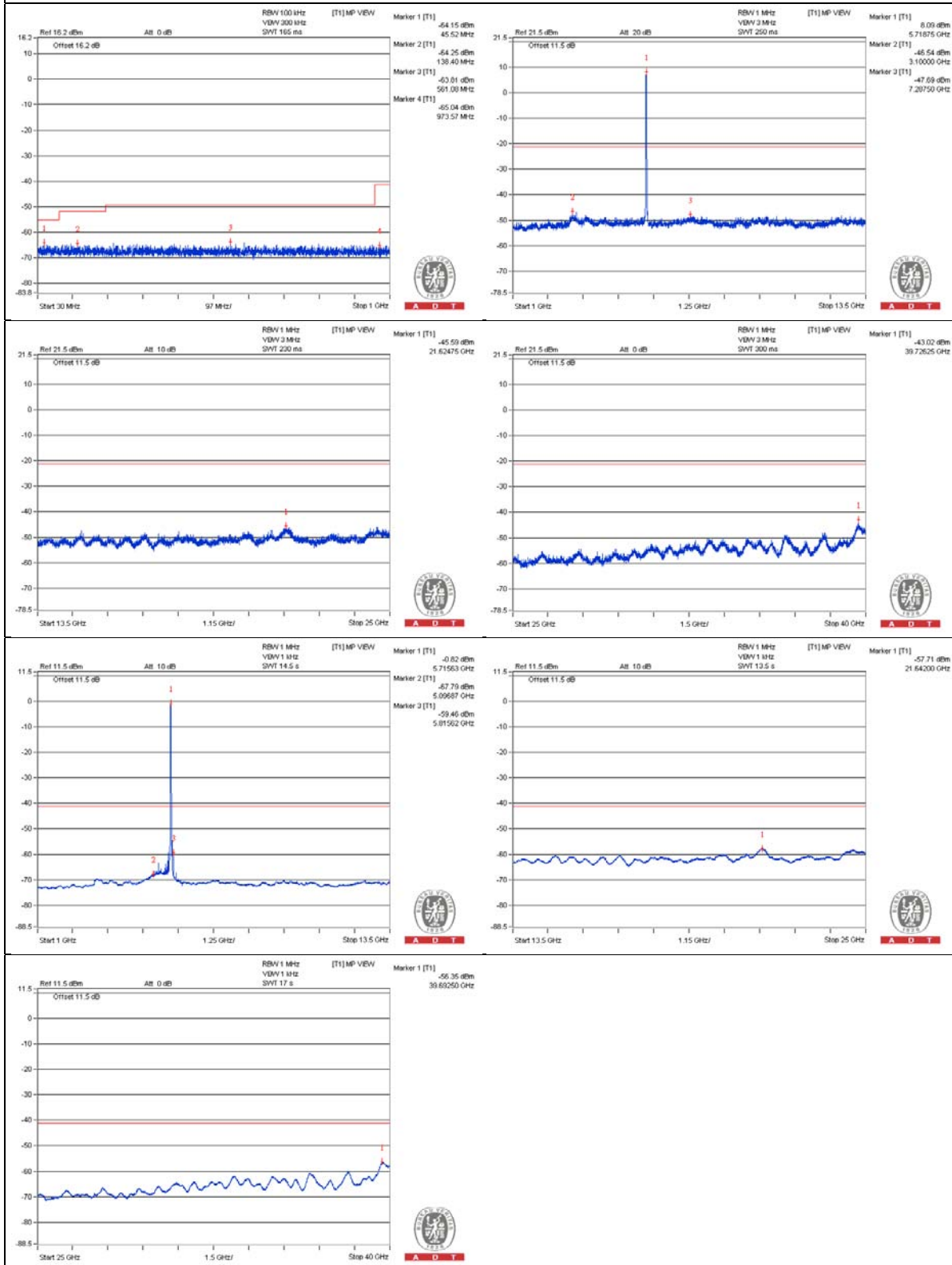
Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

Chain 0



Chain 1



Bandedge table

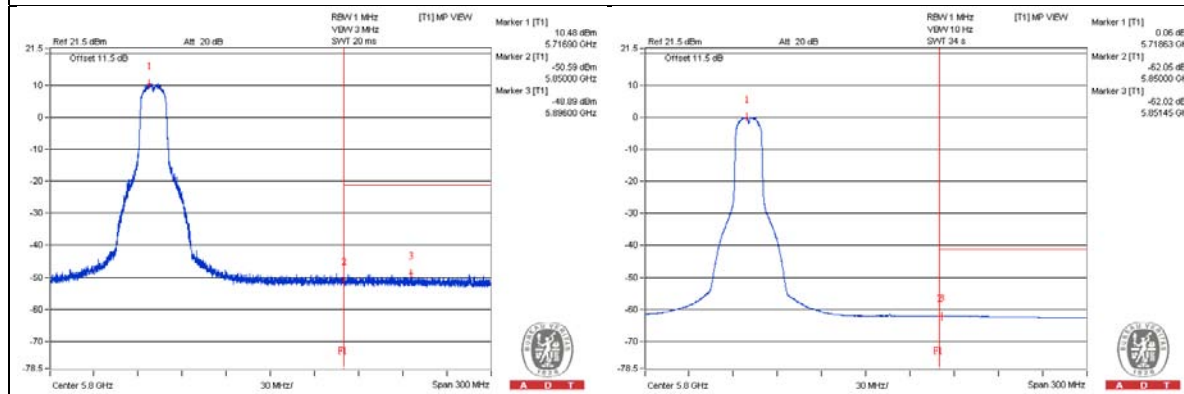
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	5838.325 PK	56.47	74	-17.53	-50.25	-48.98	7.77	-38.79
2	5912.05 AV	44.07	54	-9.93	-62.35	-61.63	7.77	-51.19

Note :

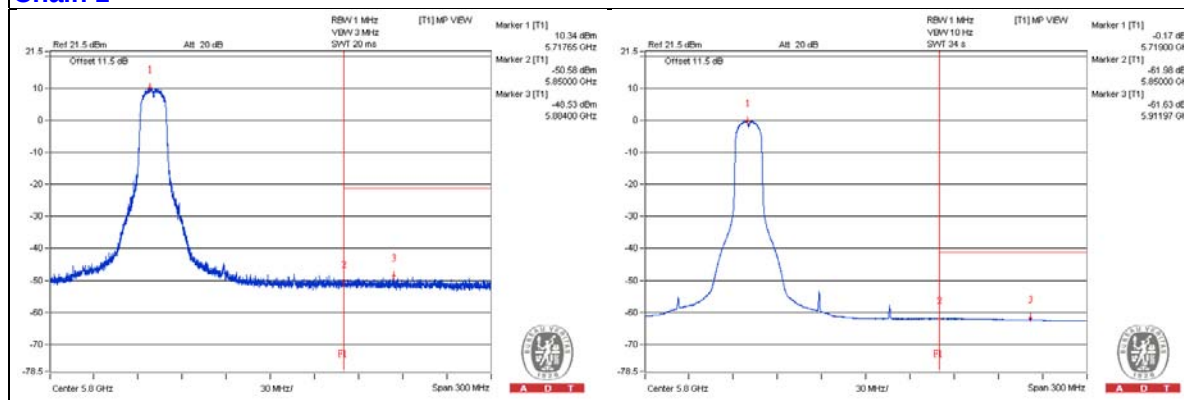
Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

Chain 0



Chain 1



802.11ac (VHT20) - Channel 149

Conducted spurious emission table

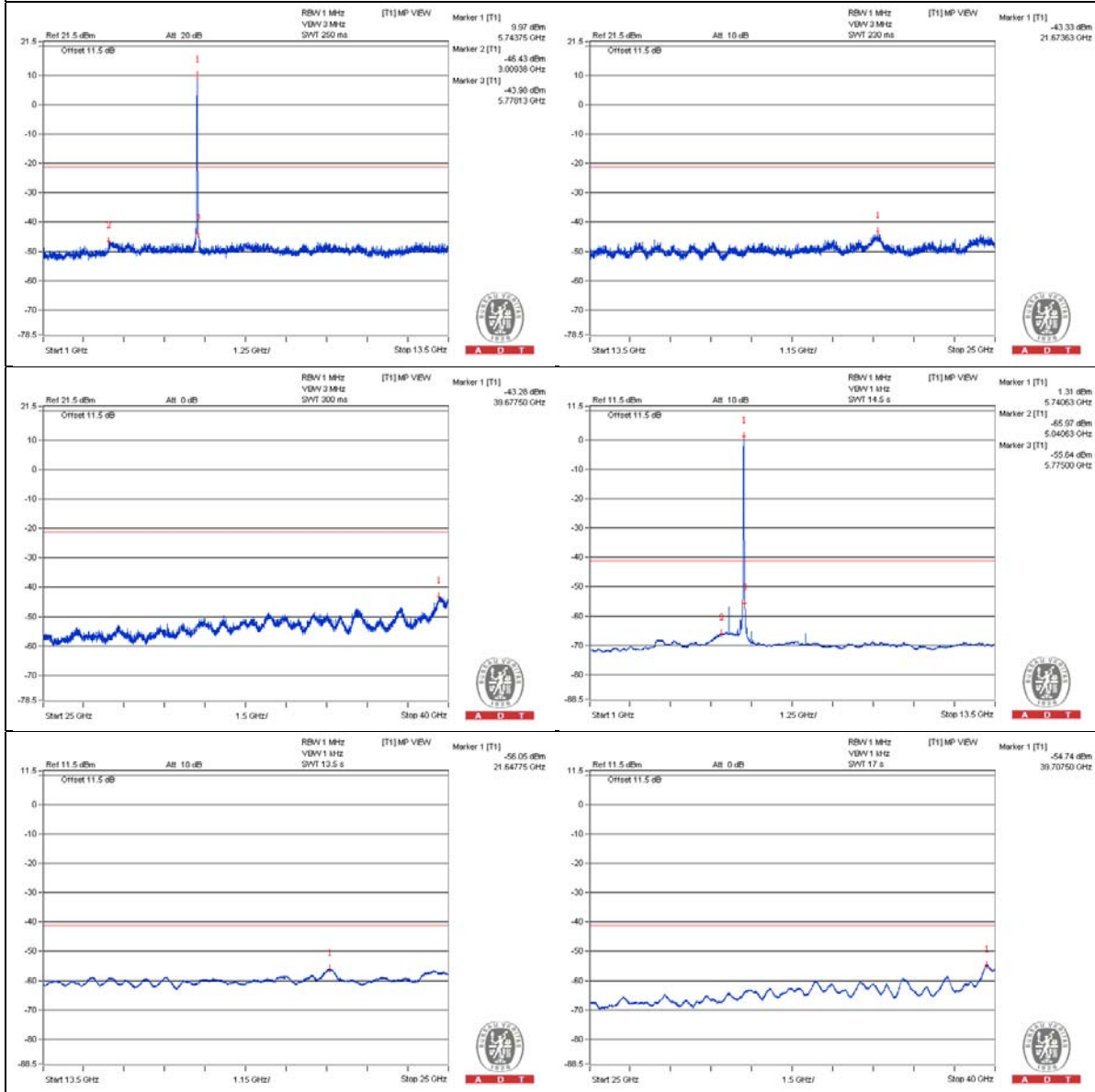
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	3831.25 PK	56.2	74	-17.8	-50.54	-49.24	7.77	-39.06
2	3831.25 AV	35.59	54	-18.41	-70.45	-70.46	7.77	-59.67
3	7659.375 PK	56.41	74	-17.59	-49.48	-49.79	7.77	-38.85
4	7659.375 AV	38.57	54	-15.43	-66.12	-69.44	7.77	-56.69
5	11490.625 PK	55.85	74	-18.15	-51.09	-49.44	7.77	-39.41
6	11490.625 AV	35.59	54	-18.41	-70.91	-70.03	7.77	-59.67
7	17234.625 PK	54.57	74	-19.43	-52.21	-50.83	7.77	-40.69
8	17234.625 AV	43.66	54	-10.34	-62.41	-62.35	7.77	-51.6

Note :

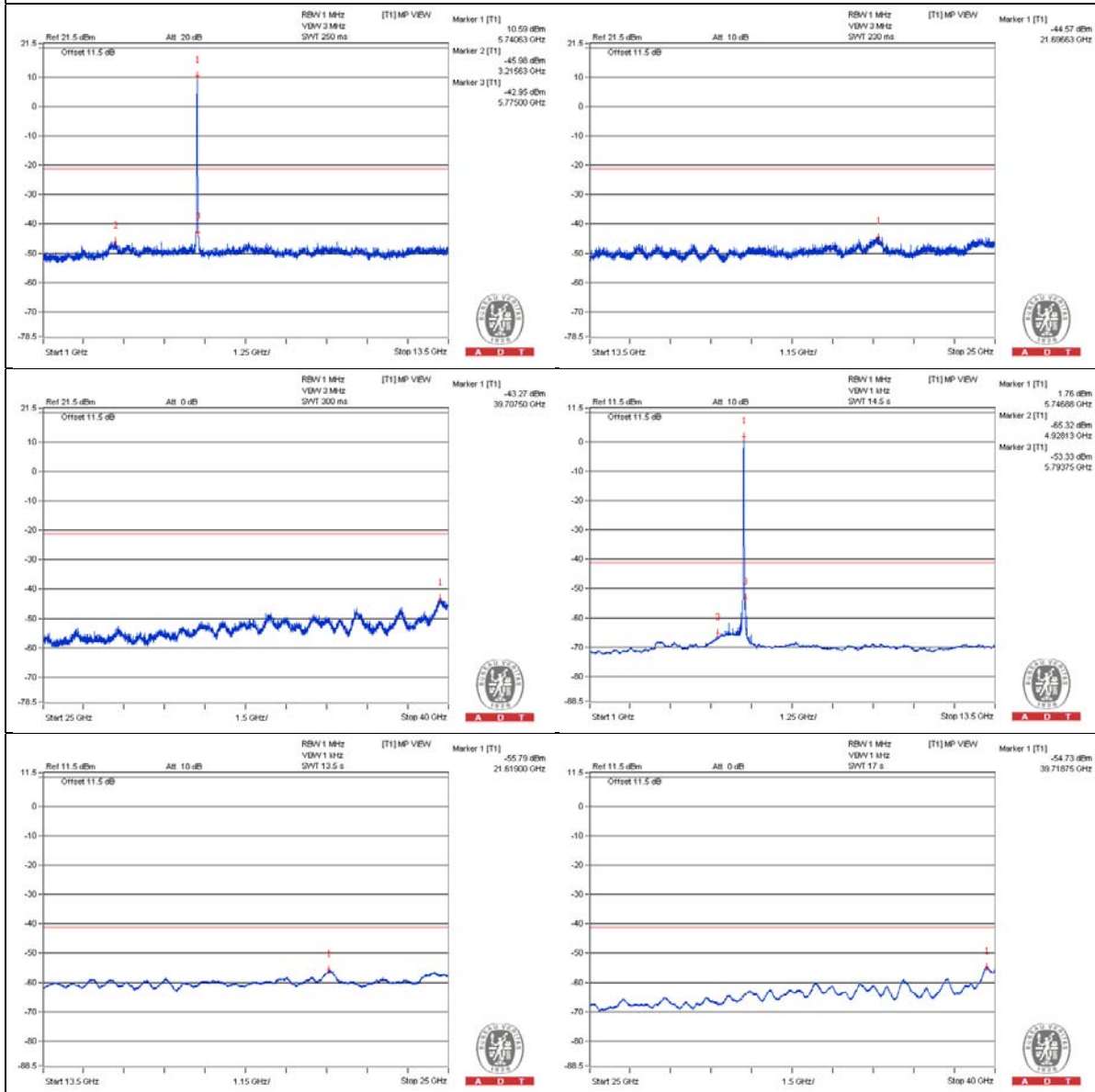
Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

Chain 0



Chain 1



Bandedge table

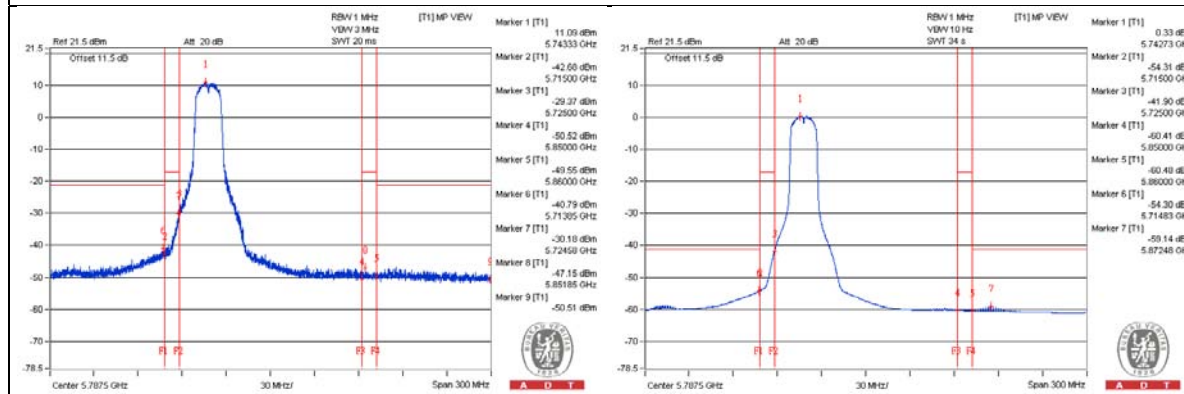
No.	Frequency (MHz)	Emission Level (dBUV/m)	Limit (dBUV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	5713.775 PK	64.44	68.2	-3.76	-40.91	-42.42	7.77	-30.82
2	5724.875 PK	74.63	78.2	-3.57	-31.98	-30.9	7.77	-20.63

Note :

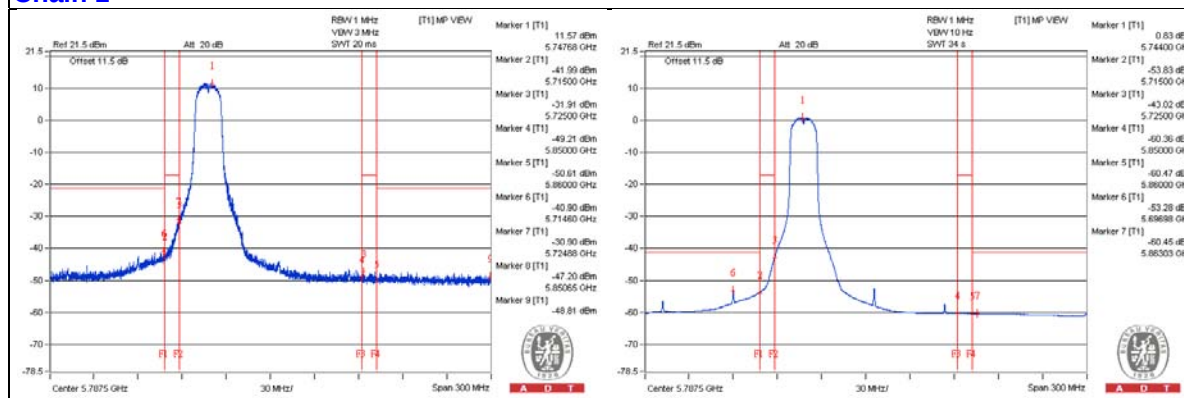
Emission Level (dBUV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

Chain 0



Chain 1



802.11ac (VHT20) - Channel 157

Conducted spurious emission table

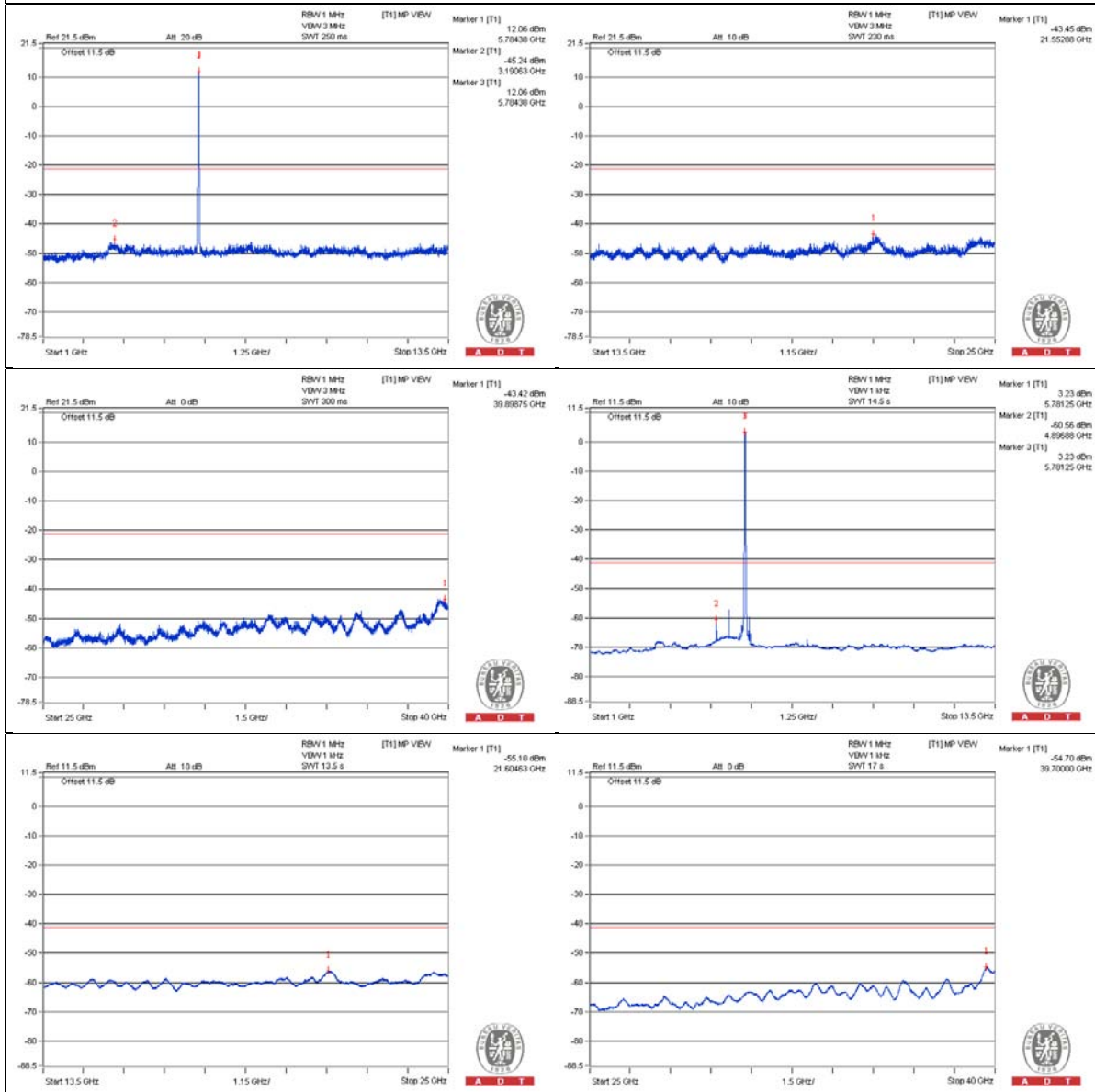
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	3856.25 PK	55.25	74	-18.75	-50.49	-51.12	7.77	-40.01
2	3856.25 AV	35.46	54	-18.54	-70.6	-70.56	7.77	-59.8
3	7712.5 PK	56.75	74	-17.25	-48.96	-49.64	7.77	-38.51
4	7712.5 AV	37.83	54	-16.17	-67.46	-69.11	7.77	-57.43
5	11568.75 PK	55.04	74	-18.96	-51.34	-50.68	7.77	-40.22
6	11571.875 AV	35.46	54	-18.54	-71.4	-69.89	7.77	-59.8
7	17355.375 PK	54.57	74	-19.43	-51.78	-51.19	7.77	-40.69
8	17355.375 AV	43.93	54	-10.07	-62.12	-62.11	7.77	-51.33

Note :

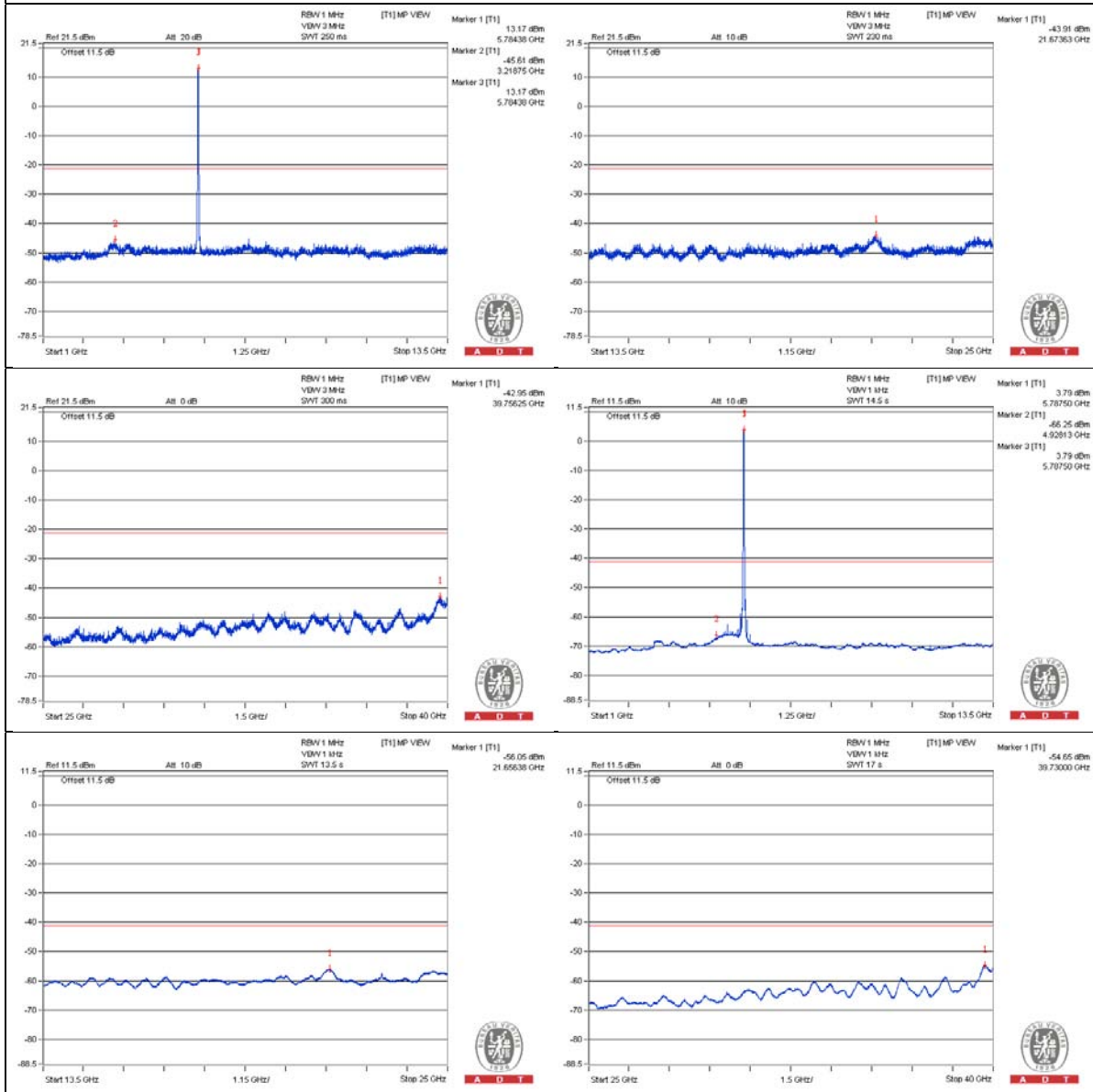
Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

Chain 0



Chain 1



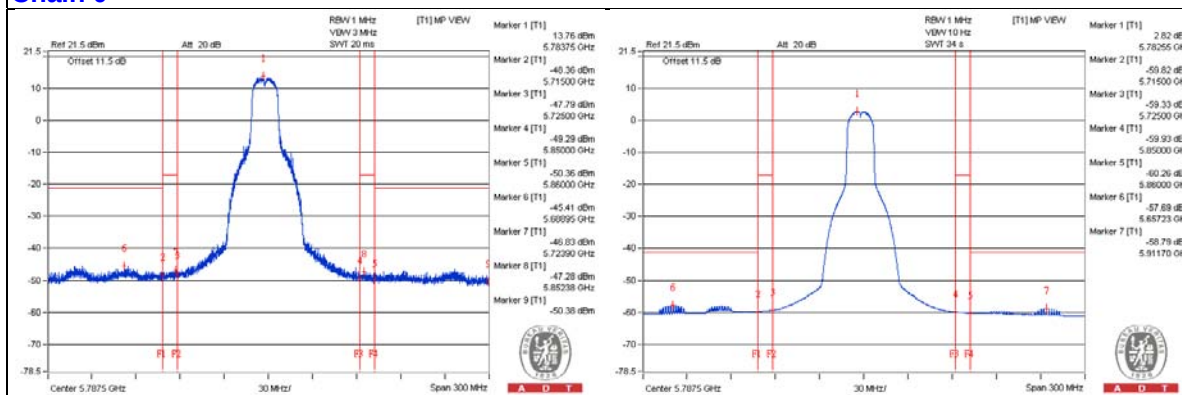
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	5715.275 PK	58.74	68.2	-9.46	-48.57	-46.32	7.77	-36.52
2	5724.275 PK	59.31	78.2	-18.89	-46.38	-47.12	7.77	-35.95
3	5853.725 PK	58.22	78.2	-19.98	-47.04	-48.76	7.77	-37.04
4	5860.4 PK	58.16	68.2	-10.04	-48.38	-47.44	7.77	-37.1

Note :

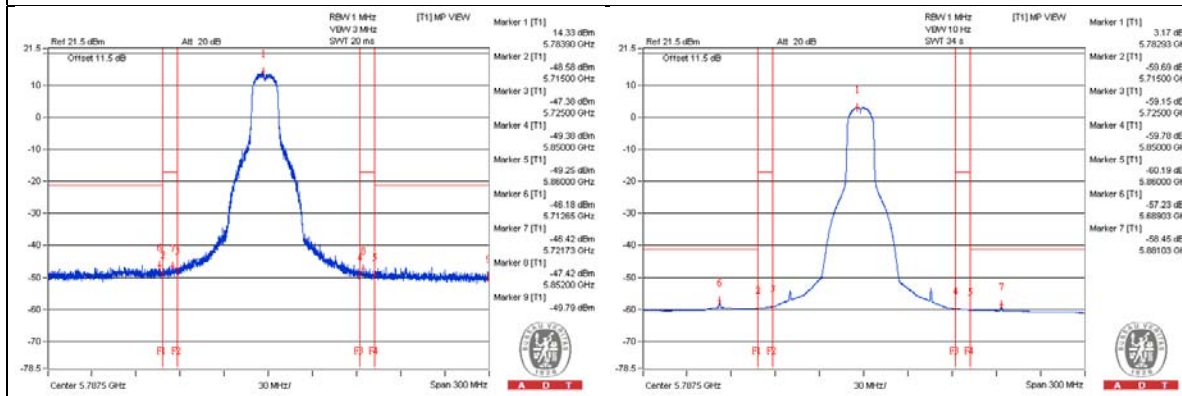
Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

Chain 0



Chain 1



802.11ac (VHT20) - Channel 165

Conducted spurious emission table

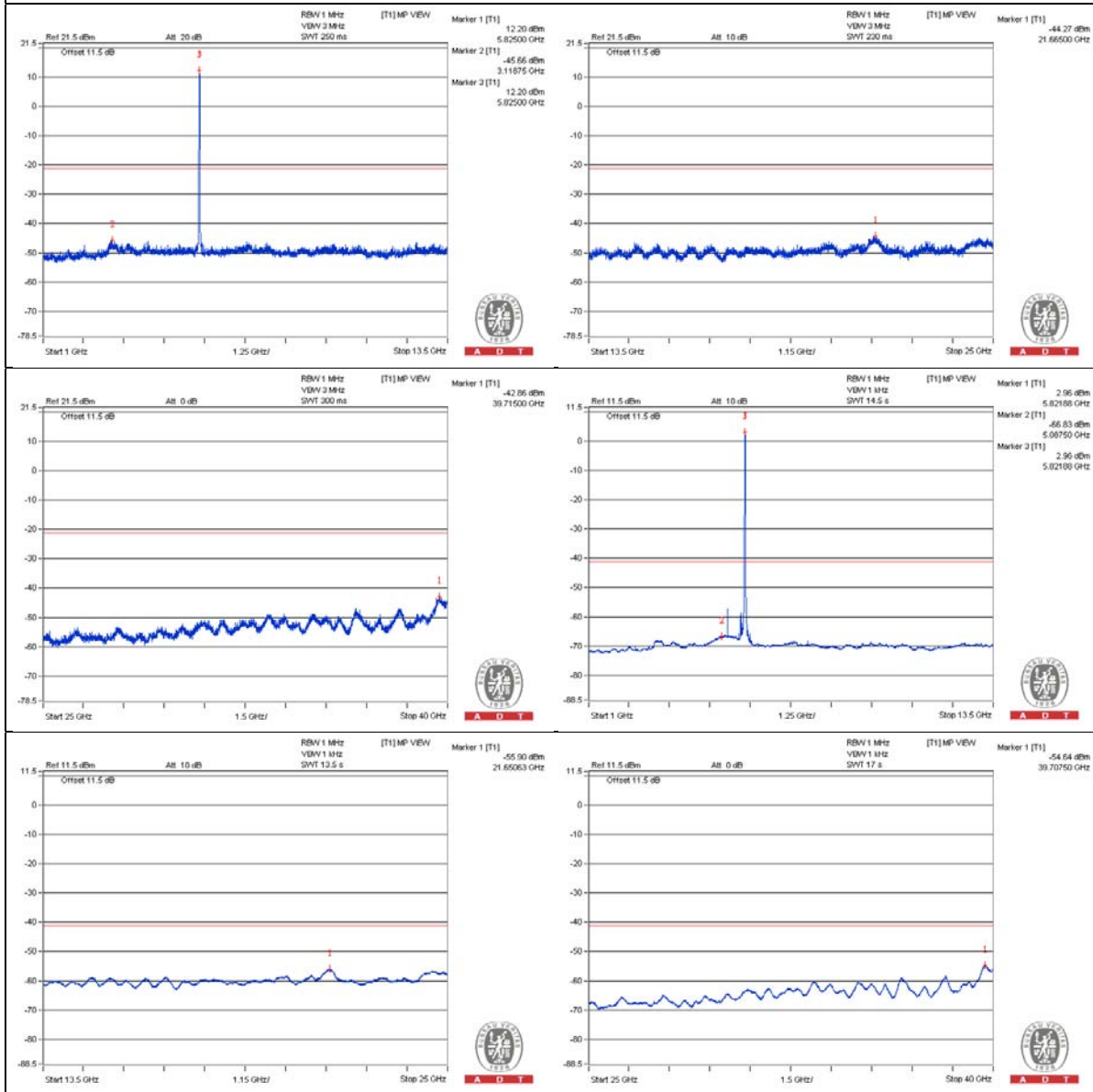
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	3884.375 PK	56.04	74	-17.96	-49.85	-50.16	7.77	-39.22
2	3884.375 AV	35.65	54	-18.35	-70.37	-70.42	7.77	-59.61
3	7765.625 PK	56.27	74	-17.73	-49.84	-49.71	7.77	-38.99
4	7765.625 AV	37.36	54	-16.64	-68.29	-69.1	7.77	-57.9
5	11650 PK	55.21	74	-18.79	-50.99	-50.68	7.77	-40.05
6	11650 AV	35.73	54	-18.27	-71.14	-69.62	7.77	-59.53
7	17473.25 PK	56.59	74	-17.41	-49.19	-49.72	7.77	-38.67
8	17476.125 AV	45.81	54	-8.19	-60.42	-60.04	7.77	-49.45

Note :

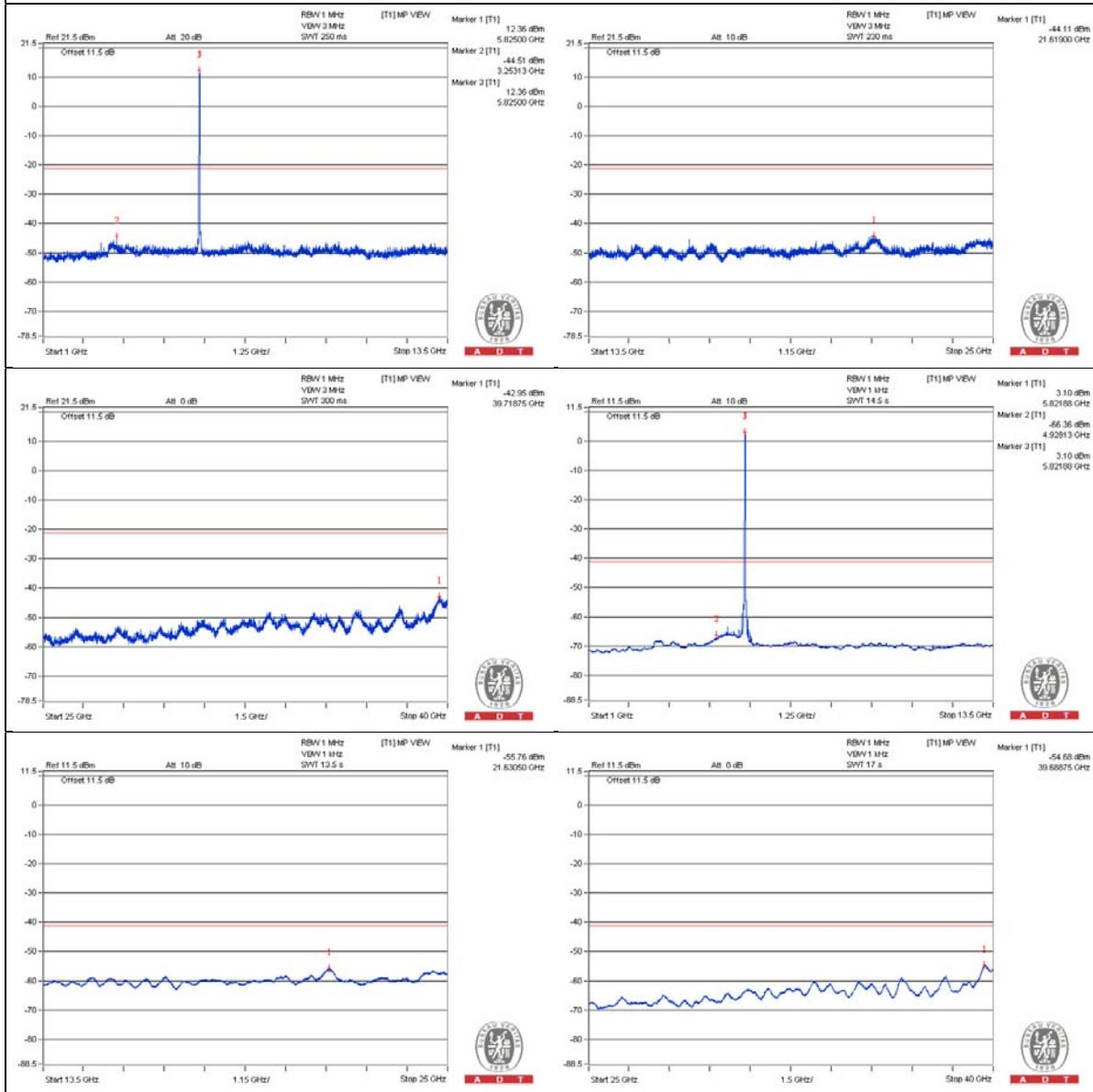
Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

Chain 0



Chain 1



Bandedge table

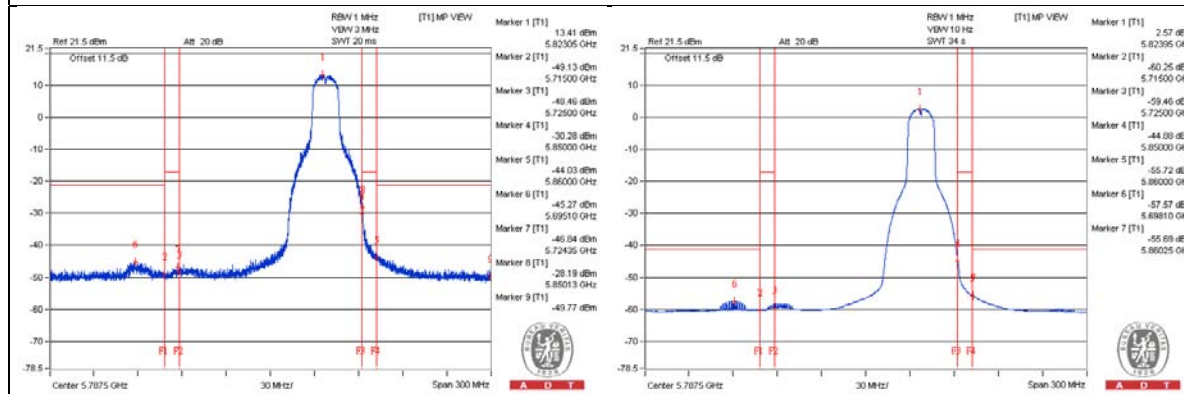
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	5850.125 PK	76.4	78.2	-1.8	-28.19	-31.83	7.77	-18.86
2	5860.475 PK	63.07	68.2	-5.13	-44.08	-42.09	7.77	-32.19

Note :

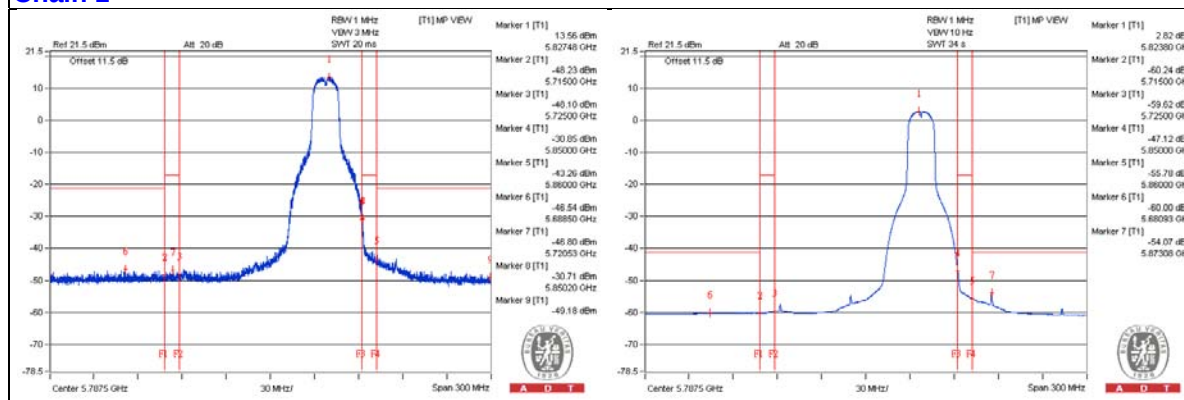
Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

Chain 0



Chain 1



802.11ac (VHT40) - Channel 142

Conducted spurious emission table

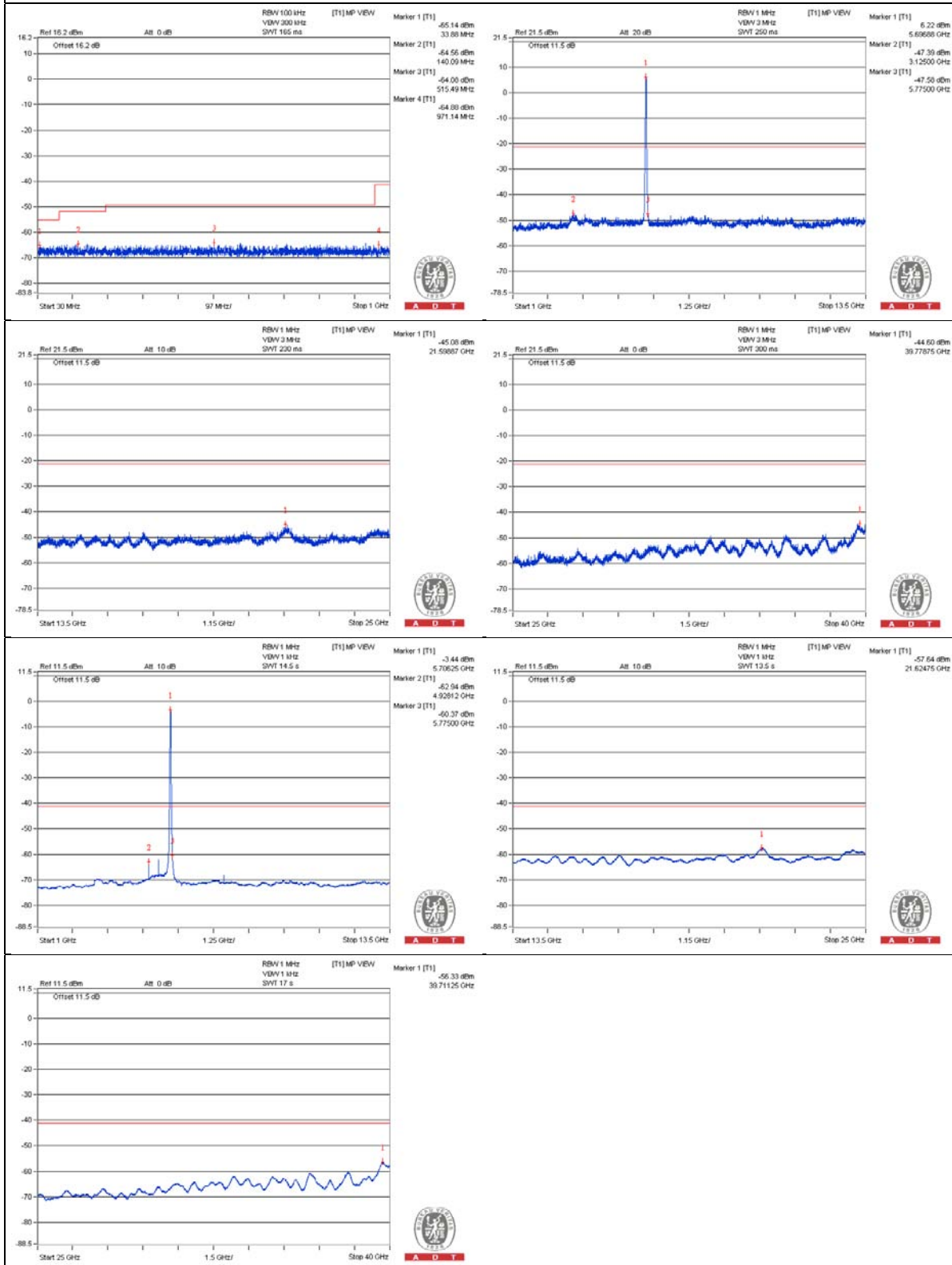
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	3796.875 PK	55.67	74	-18.33	-51.47	-49.5	7.77	-39.59
2	3790.625 AV	34.76	54	-19.24	-71.44	-71.13	7.77	-60.5
3	7596.875 PK	56.65	74	-17.35	-50.62	-48.44	7.77	-38.61
4	7612.5 AV	36.42	54	-17.58	-68.38	-71.35	7.77	-58.84
5	11409.375 PK	54.38	74	-19.62	-52.22	-51.17	7.77	-40.88
6	11412.5 AV	33.75	54	-20.25	-72.24	-72.34	7.77	-61.51
7	17128.25 PK	55.03	74	-18.97	-51.93	-50.26	7.77	-40.23
8	17116.75 AV	43.76	54	-10.24	-62.29	-62.28	7.77	-51.5

Note :

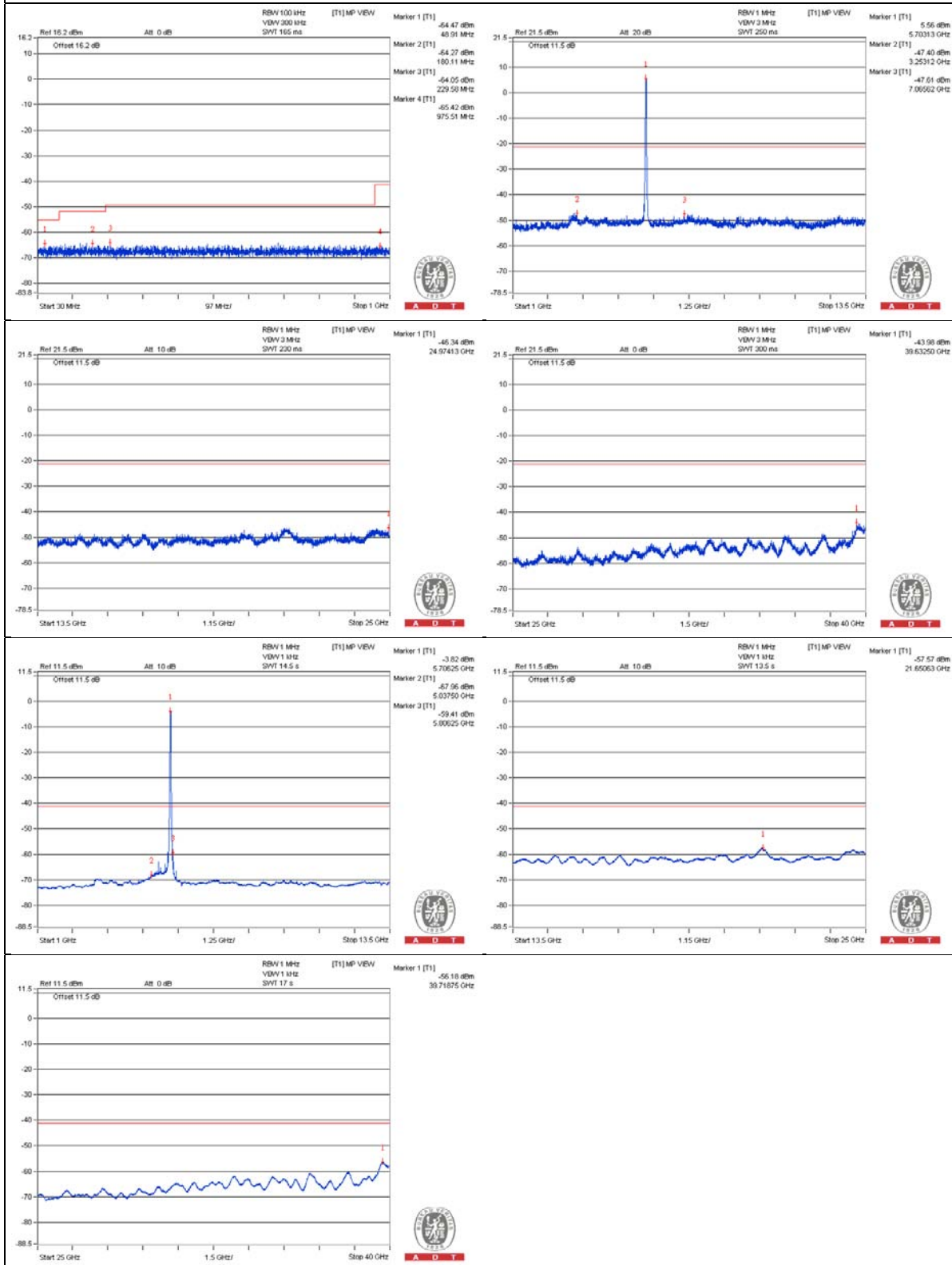
Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

Chain 0



Chain 1



Bandedge table

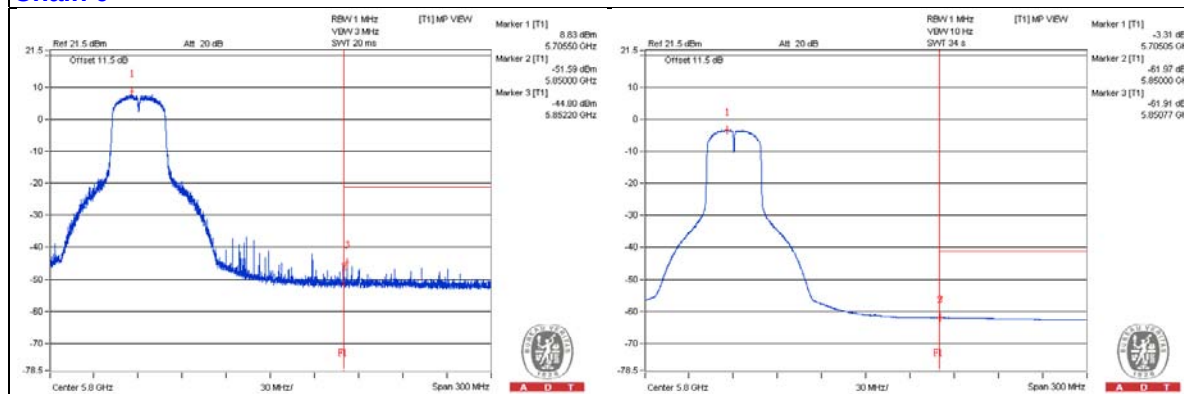
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	5828.125 PK	61.44	74	-12.56	-42.13	-50.89	7.77	-33.82
2	5825.35 AV	44.23	54	-9.77	-61.84	-61.78	7.77	-51.03

Note :

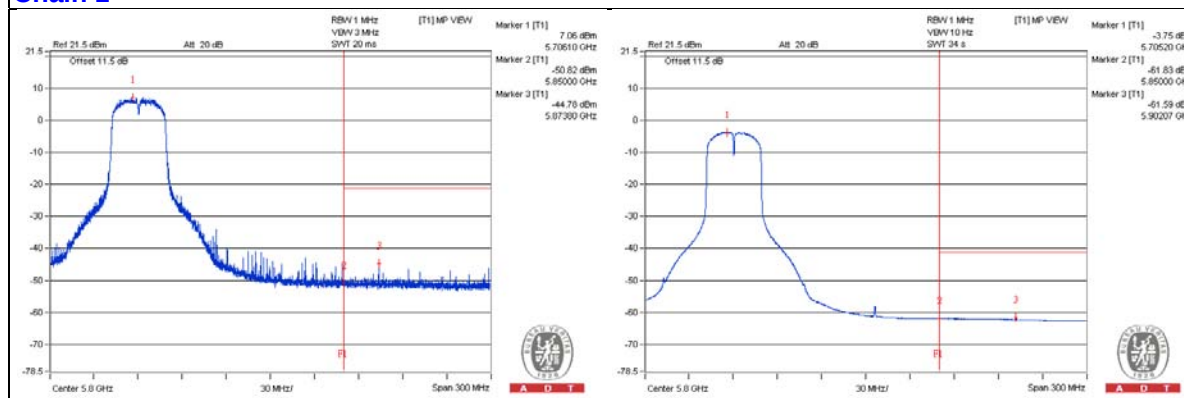
Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

Chain 0



Chain 1



802.11ac (VHT40) - Channel 151

Conducted spurious emission table

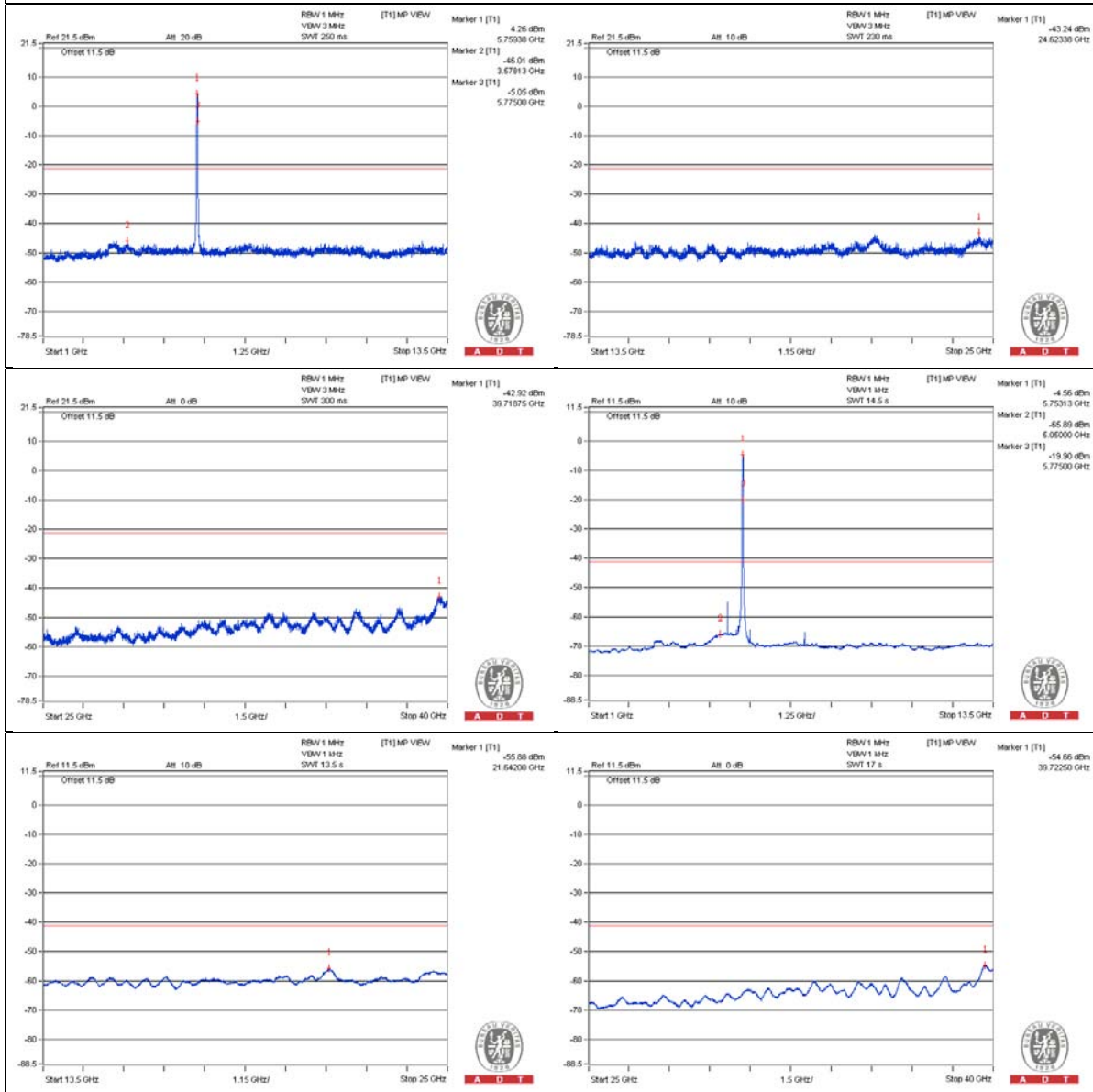
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	3837.5 PK	55.91	74	-18.09	-50.54	-49.75	7.77	-39.35
2	3837.5 AV	35.61	54	-18.39	-70.27	-70.6	7.77	-59.65
3	7675 PK	57.4	74	-16.6	-48.8	-48.48	7.77	-37.86
4	7675 AV	39.21	54	-14.79	-65.15	-69.62	7.77	-56.05
5	11509.375 PK	55.83	74	-18.17	-50.54	-49.91	7.77	-39.43
6	11509.375 AV	35.21	54	-18.79	-71.07	-70.6	7.77	-60.05
7	17263.375 PK	53.79	74	-20.21	-52.93	-51.67	7.77	-41.47
8	17263.375 AV	43.38	54	-10.62	-62.51	-62.82	7.77	-51.88

Note :

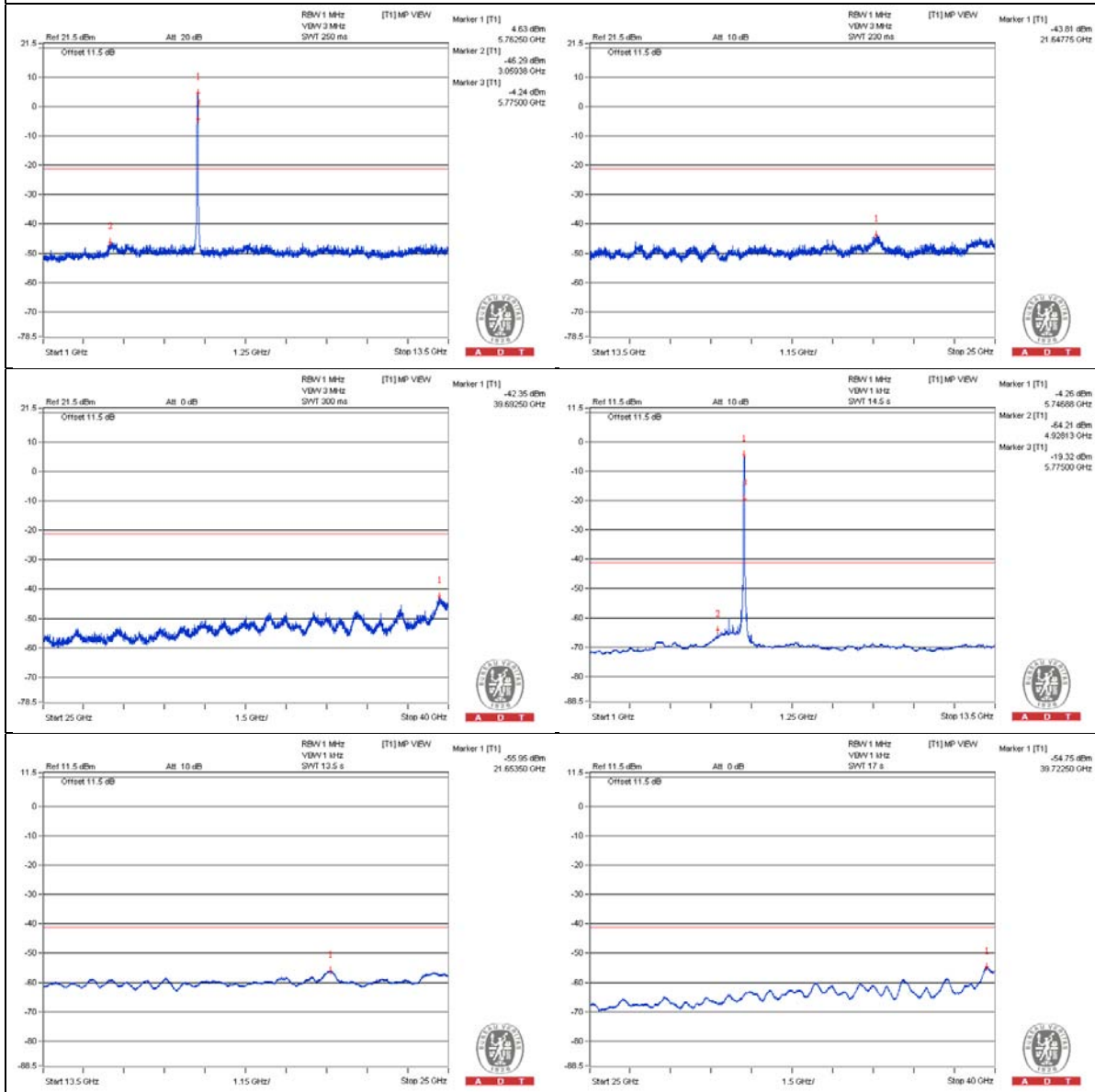
Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

Chain 0



Chain 1



Bandedge table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	5708.15 PK	69.13	68.2	* 0.93	-34.72	-41.54	7.77	-26.13
2	5724.95 PK	70.22	78.2	-7.98	-36.34	-35.36	7.77	-25.04

Note :

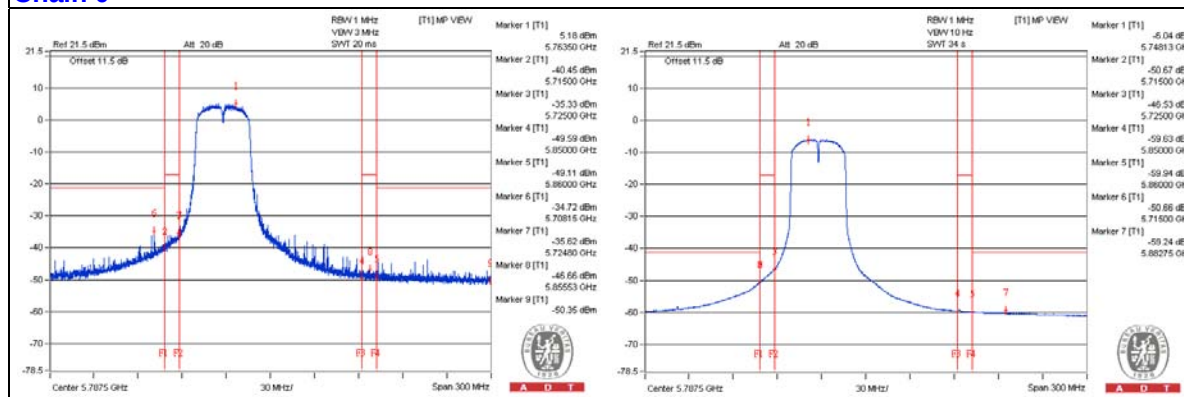
Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

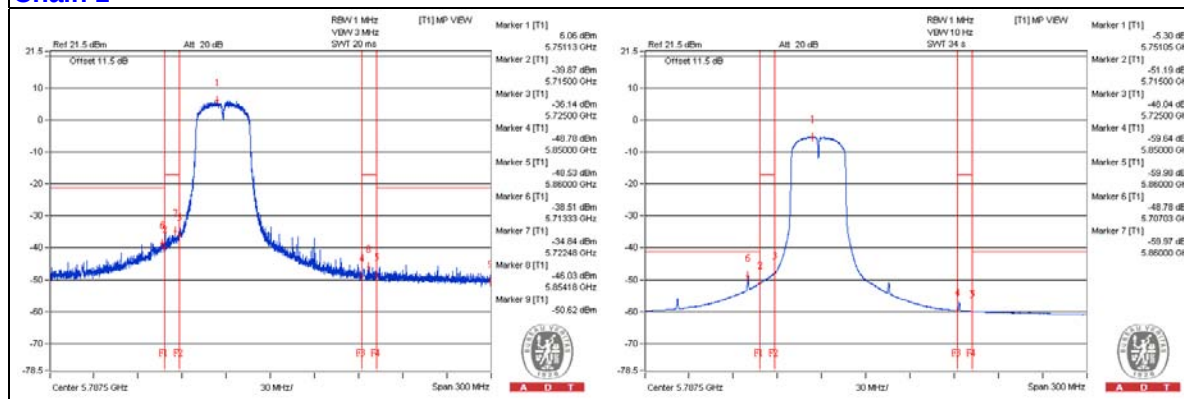
* The unwanted emission was verified and the test result was passed by radiated measurement.

(Please refer APPENDIX A)

Chain 0



Chain 1



802.11ac (VHT40) - Channel 159

Conducted spurious emission table

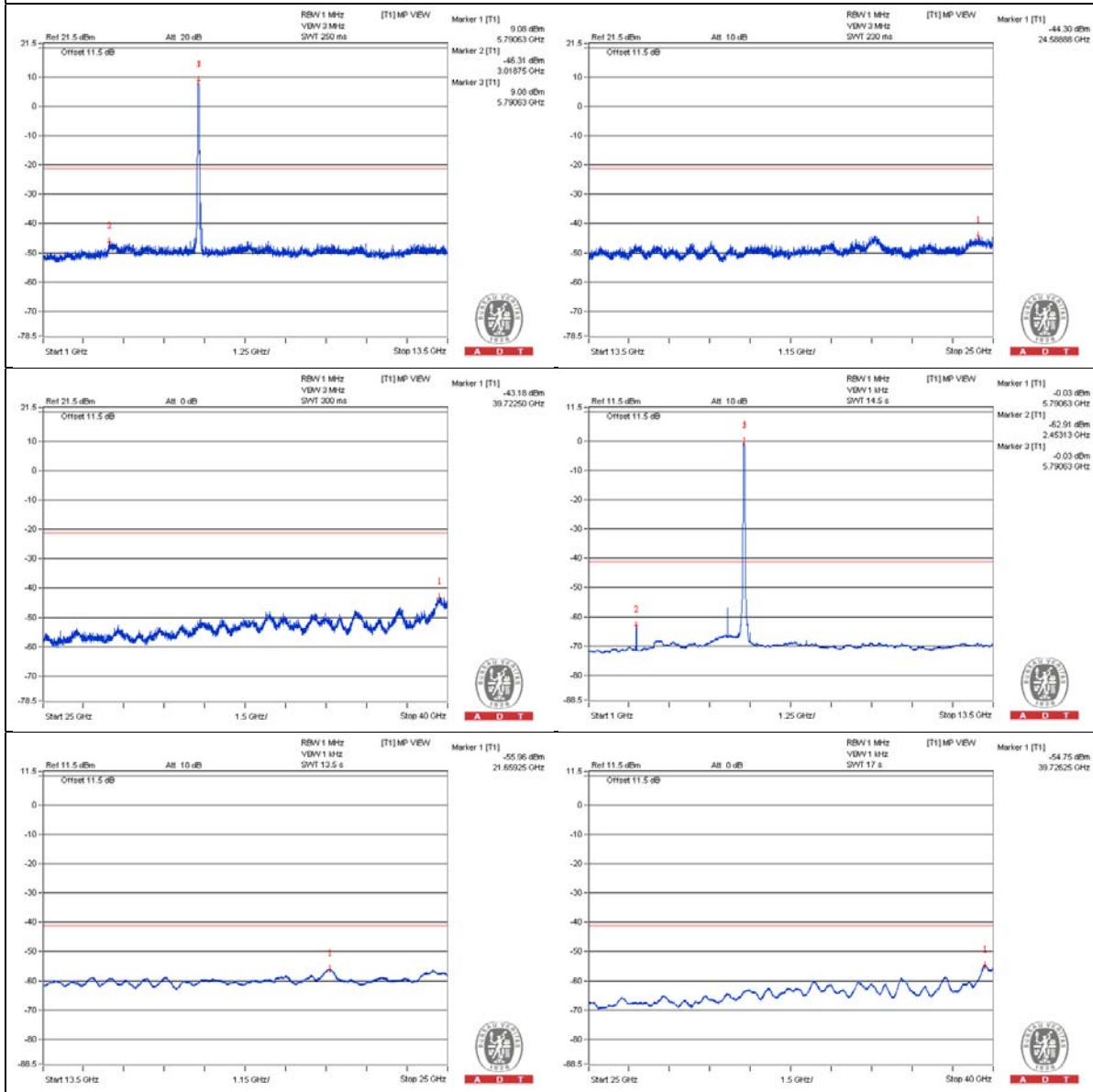
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	3862.5 PK	55.81	74	-18.19	-49.95	-50.52	7.77	-39.45
2	3862.5 AV	35.41	54	-18.59	-70.54	-70.72	7.77	-59.85
3	7725 PK	56.91	74	-17.09	-49.14	-49.13	7.77	-38.35
4	7728.125 AV	37.55	54	-16.45	-68.02	-69.01	7.77	-57.71
5	11590.625 PK	55.03	74	-18.97	-51.24	-50.79	7.77	-40.23
6	11590.625 AV	35.04	54	-18.96	-71.29	-70.73	7.77	-60.22
7	17384.125 PK	54.9	74	-19.1	-51.43	-50.86	7.77	-40.36
8	17387 AV	44.53	54	-9.47	-61.55	-61.48	7.77	-50.73

Note :

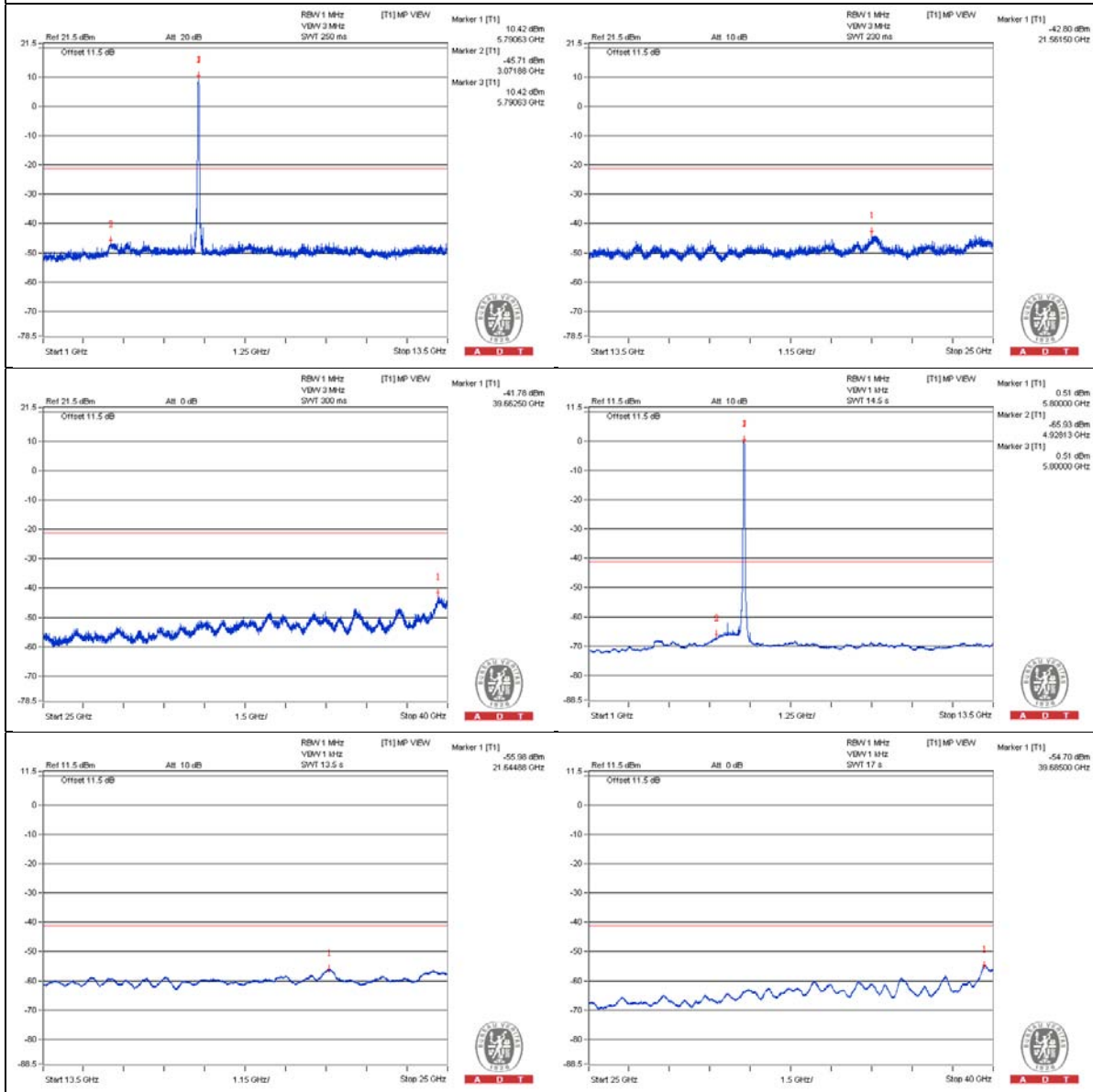
Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

Chain 0



Chain 1



Bandedge table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	5851.1 PK	74.75	78.2	-3.45	-29.53	-34.29	7.77	-20.51
2	5860.625 PK	69.48	74	-4.52	-34.94	-39.18	7.77	-25.78
3	5860.025 AV	54.54	54	* 0.54	-51.15	-51.88	7.77	-40.72

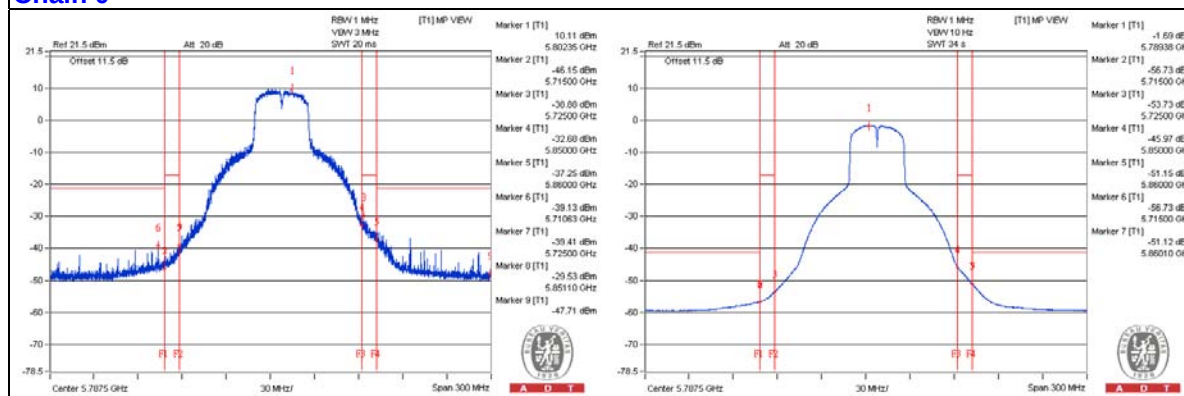
Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

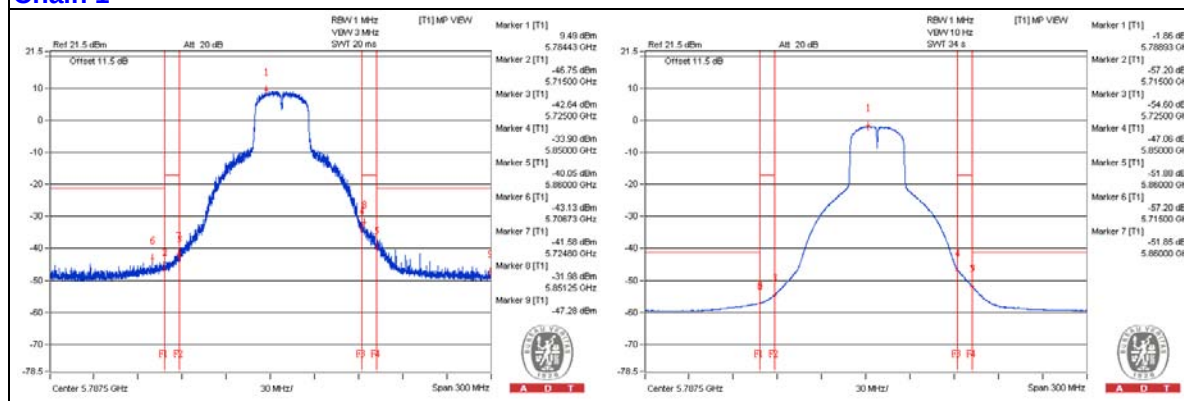
d = measurement distance in 3 meters.

* The unwanted emission was verified and the test result was passed by radiated measurement.
(Please refer APPENDIX A)

Chain 0



Chain 1



802.11ac (VHT80) - Channel 138

Conducted spurious emission table

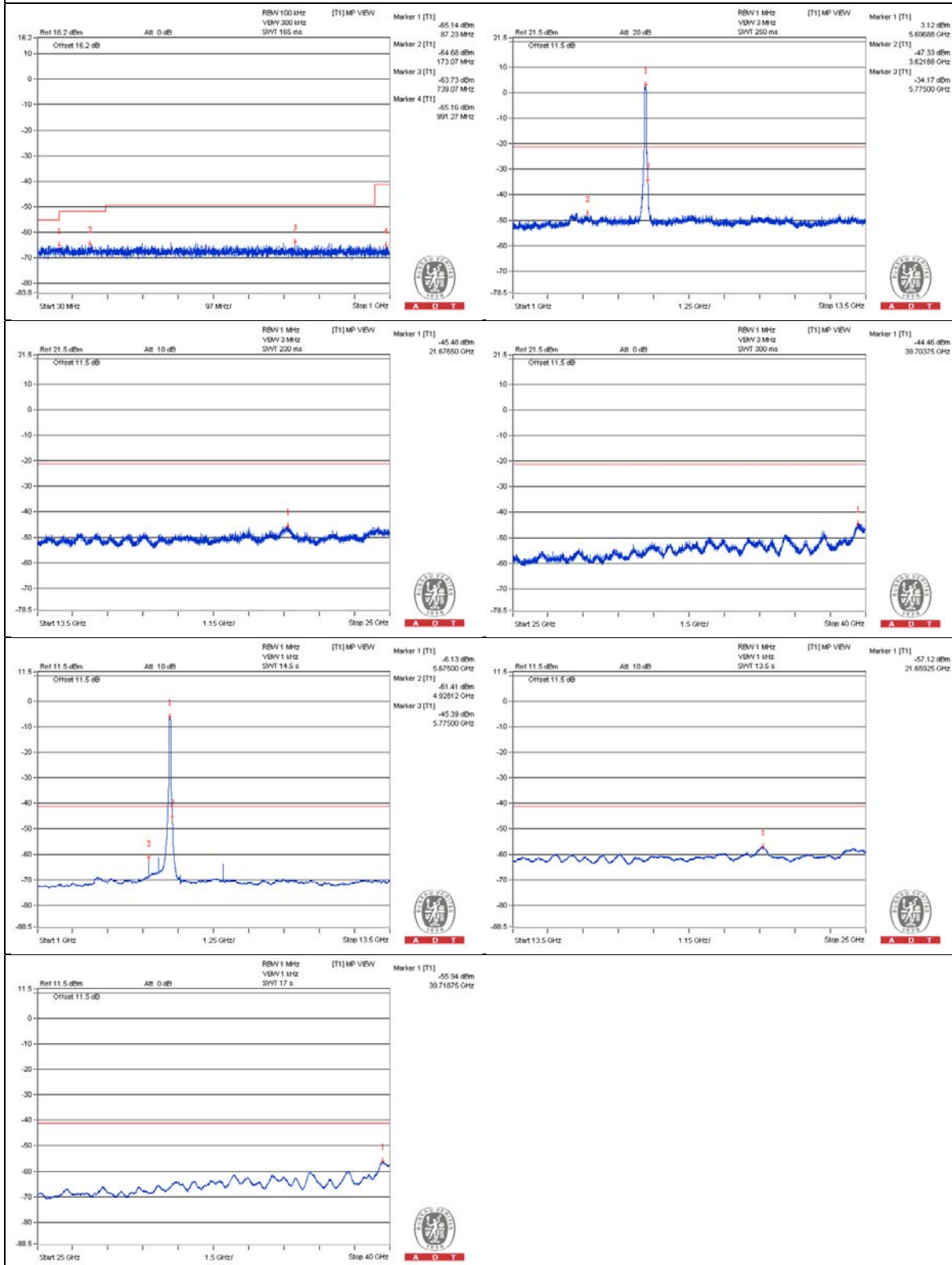
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	3784.375 PK	56.51	74	-17.49	-49.83	-49.25	7.77	-38.75
2	3775 AV	35.58	54	-18.42	-70.24	-70.7	7.77	-59.68
3	7606.25 PK	56.79	74	-17.21	-48.6	-50.01	7.77	-38.47
4	7587.5 AV	39.91	54	-14.09	-64	-70.51	7.77	-55.35
5	11375 PK	55.4	74	-18.6	-50.65	-50.63	7.77	-39.86
6	11378.125 AV	34.49	54	-19.51	-71.38	-71.73	7.77	-60.77
7	17070.75 PK	56.68	74	-17.32	-50.22	-48.65	7.77	-38.58
8	17062.125 AV	45.07	54	-8.93	-60.96	-60.99	7.77	-50.19

Note :

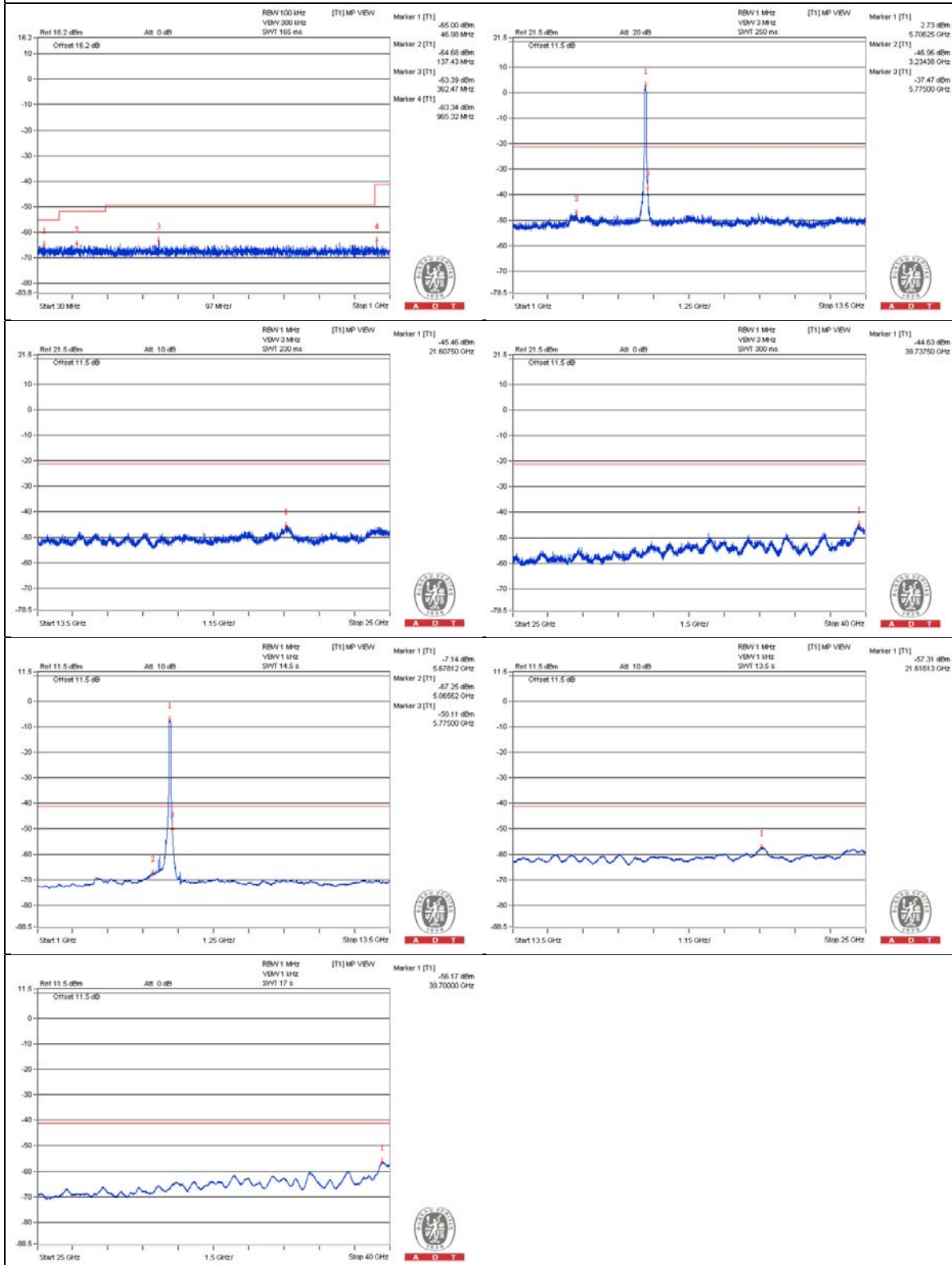
Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

Chain 0



Chain 1



Bandedge table

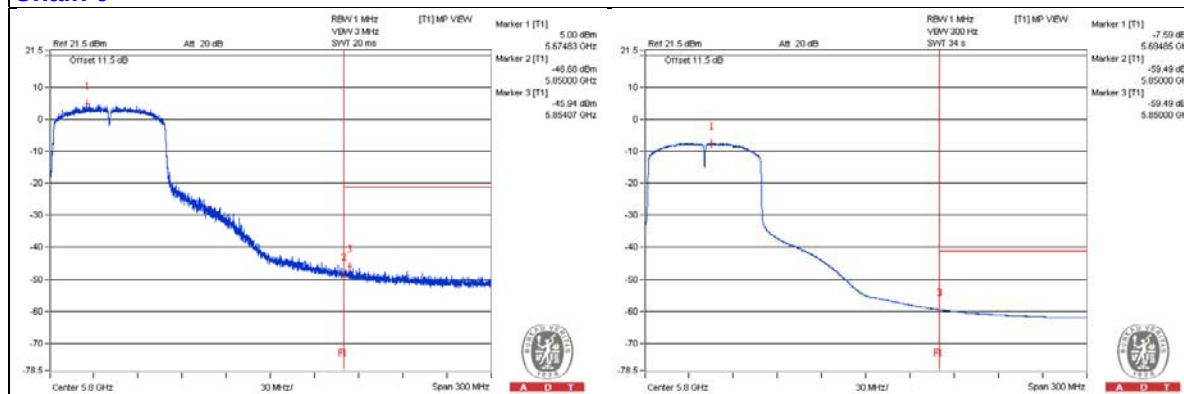
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	5834.05 PK	60.61	74	-13.39	-46.36	-44.66	7.77	-34.65
2	5825.05 AV	48.29	54	-5.71	-57.57	-57.93	7.77	-46.97

Note :

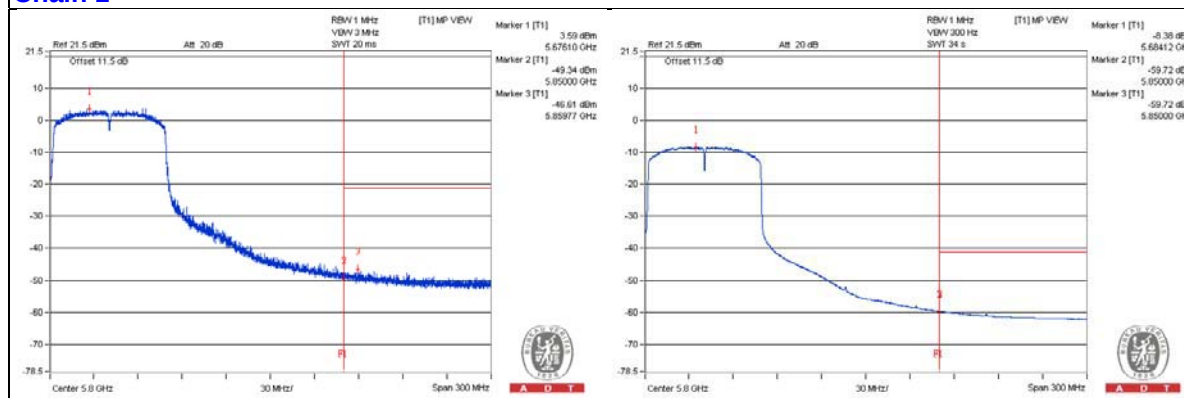
Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

Chain 0



Chain 1



802.11ac (VHT80) - Channel 155

Conducted spurious emission table

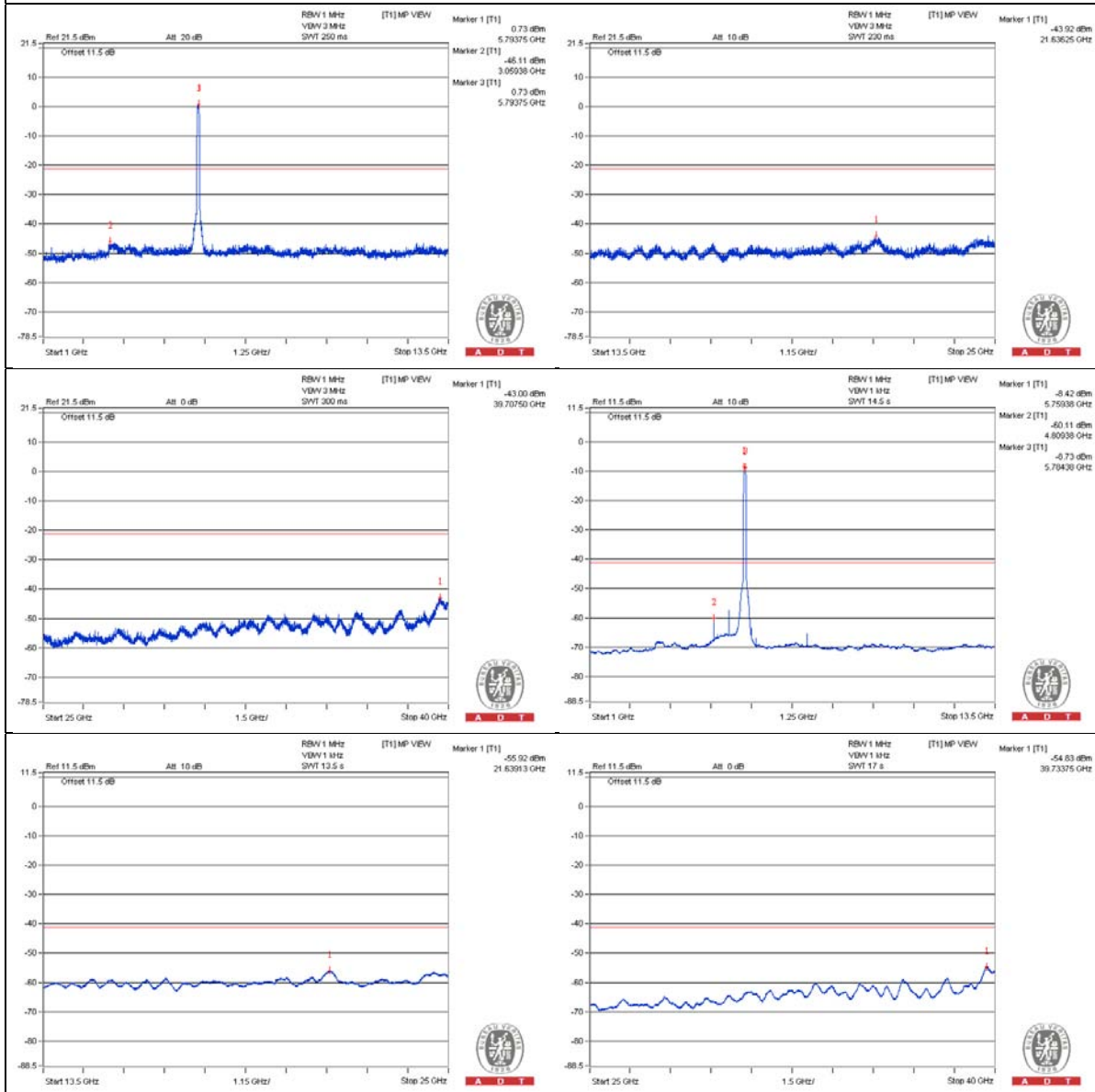
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	3850 PK	55.26	74	-18.74	-51.24	-50.37	7.77	-40
2	3850 AV	35.54	54	-18.46	-70.54	-70.46	7.77	-59.72
3	7700 PK	56.48	74	-17.52	-49.67	-49.46	7.77	-38.78
4	7700 AV	39.14	54	-14.86	-65.47	-69.04	7.77	-56.12
5	11550 PK	54.67	74	-19.33	-51.96	-50.85	7.77	-40.59
6	11550 AV	34.82	54	-19.18	-71.45	-71.01	7.77	-60.44
7	17323.75 PK	55.24	74	-18.76	-50.9	-50.7	7.77	-40.02
8	17323.75 AV	43.79	54	-10.21	-62.13	-62.38	7.77	-51.47

Note :

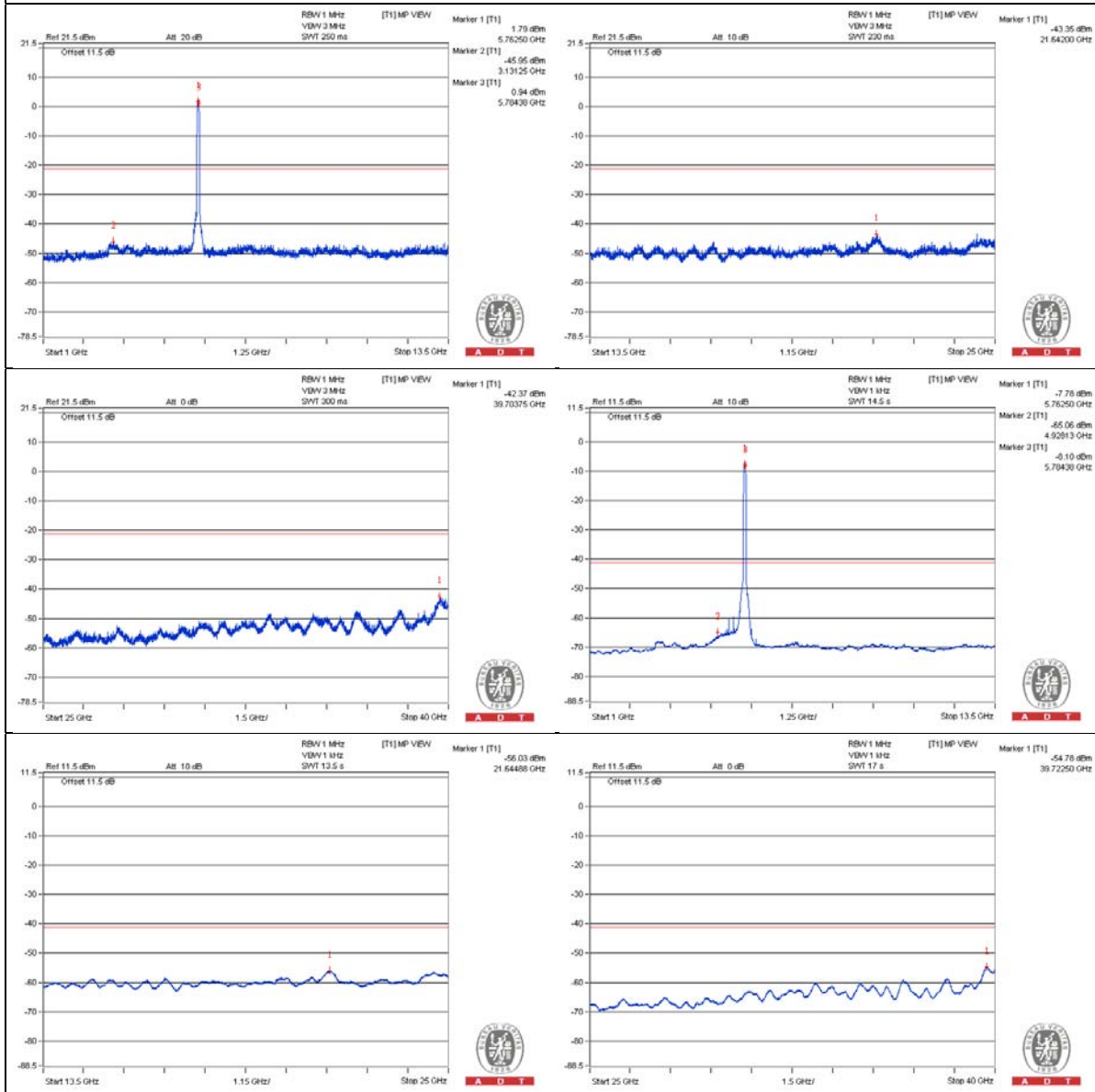
Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

Chain 0



Chain 1



Bandedge table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	5701.85 PK	68.94	68.2	* 0.74	-39.43	-35.59	7.77	-26.32
2	5723.825 PK	72.54	78.2	-5.66	-33.51	-33.49	7.77	-22.72
3	5850.8 PK	66.24	78.2	-11.96	-40.7	-39.06	7.77	-29.02
4	5873.375 PK	65.9	68.2	-2.3	-43.53	-38.26	7.77	-29.36

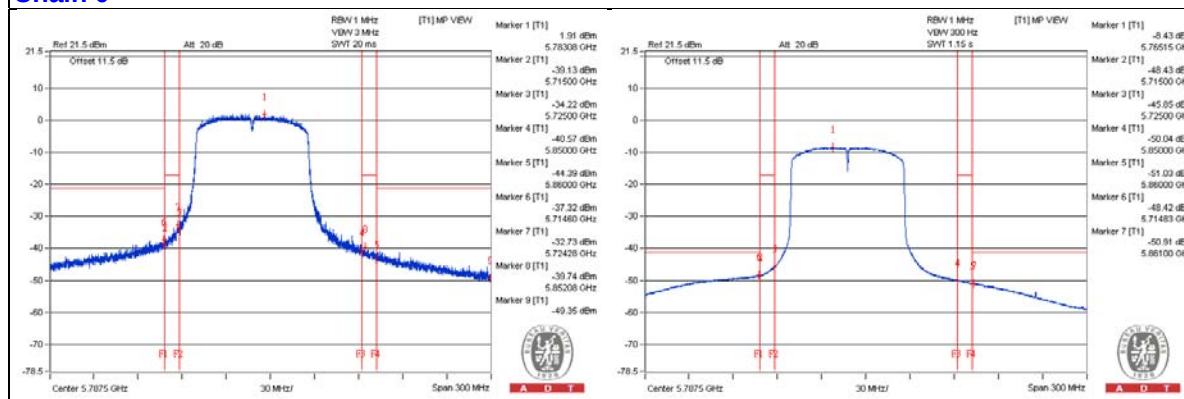
Note :

Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

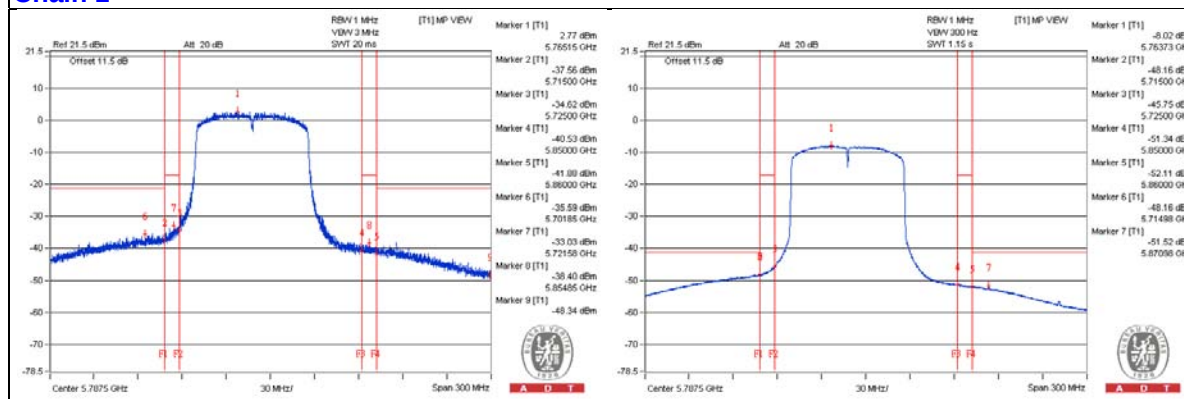
d = measurement distance in 3 meters.

* The unwanted emission was verified and the test result was passed by radiated measurement.
(Please refer APPENDIX A)

Chain 0



Chain 1



Below 1GHz Data

802.11a - Channel 157

Conducted spurious emission table

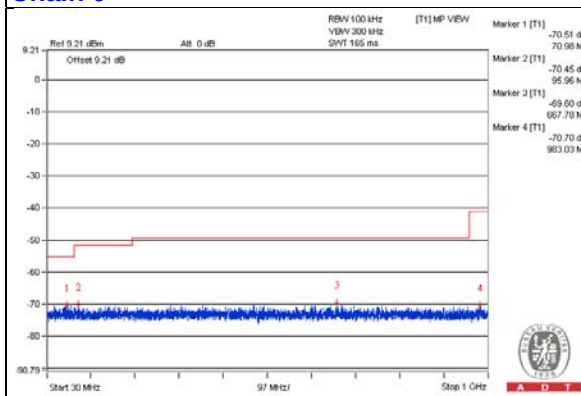
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)		Correction Factor (dB)	EIRP Level (dBm)
					Chain0	Chain1		
1	78.5	34.65	40	-5.35	-73.59	-69.93	7.77	-60.61
2	163.375	36.15	43.5	-7.35	-72.51	-68.27	7.77	-59.11
3	371.6825	34.53	46	-11.47	-70.07	-73.69	7.77	-60.73
4	426.9725	34.74	46	-11.26	-71.3	-71.31	7.77	-60.52
5	767.4425	35.3	46	-10.7	-70.54	-70.94	7.77	-59.96
6	963.625	35.24	54	-18.76	-73	-69.34	7.77	-60.02

Note :

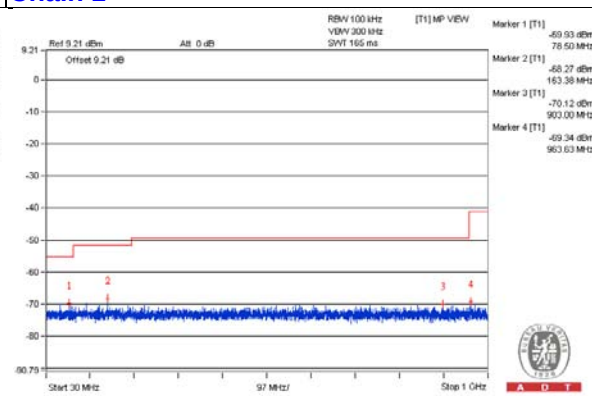
Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8

d = measurement distance in 3 meters.

Chain 0



Chain 1

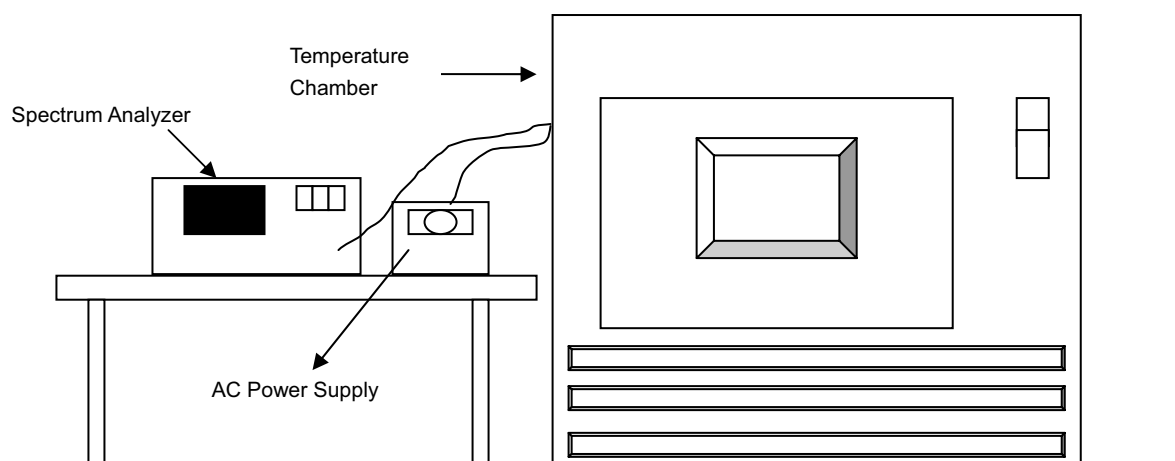


4.5 Frequency Stability Measurement

4.5.1 Limits of Frequency Stability Measurement

The frequency of the carrier signal shall be maintained within band of operation

4.5.2 Test Setup



4.5.3 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSP 40	100060	May 08, 2015	May 07, 2016
Temperature & Humidity Chamber GIANTFORCE	GTH-150-40-S P-AR	MAA0812-008	Jan. 12, 2015	Jan. 11, 2016

Note:

- The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
- Tested date : July 02, 2015

4.5.4 Test Procedures

- The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
- Turn the EUT on and couple its output to a spectrum analyzer.
- Turn the EUT off and set the chamber to the highest temperature specified.
- Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
- Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
- The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Conditions

Set the EUT transmit at un-modulation mode to test frequency stability.

4.5.7 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5745MHz									
Temp. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
50	120	5745.0267	0.00046	5745.0239	0.00042	5745.029	0.00050	5745.0276	0.00048
40	120	5744.9738	-0.00046	5744.9759	-0.00042	5744.9731	-0.00047	5744.9708	-0.00051
30	120	5744.9789	-0.00037	5744.9746	-0.00044	5744.978	-0.00038	5744.9746	-0.00044
20	120	5745.0241	0.00042	5745.0249	0.00043	5745.0241	0.00042	5745.0244	0.00042
10	120	5744.9977	-0.00004	5744.9959	-0.00007	5744.9954	-0.00008	5744.9958	-0.00007
0	120	5744.9976	-0.00004	5745.001	0.00002	5745.0022	0.00004	5744.9981	-0.00003
-10	120	5745.0171	0.00030	5745.0209	0.00036	5745.0195	0.00034	5745.0176	0.00031
-20	120	5744.9739	-0.00045	5744.9699	-0.00052	5744.9699	-0.00052	5744.9737	-0.00046
-30	120	5745.0055	0.00010	5745.0049	0.00009	5745.0005	0.00001	5745.0017	0.00003

Frequency Stability Versus Temp.									
Operating Frequency: 5745MHz									
Temp. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
20	138	5745.0251	0.00044	5745.0243	0.00042	5745.0241	0.00042	5745.0253	0.00044
	120	5745.0241	0.00042	5745.0249	0.00043	5745.0241	0.00042	5745.0244	0.00042
	102	5745.0239	0.00042	5745.0254	0.00044	5745.0242	0.00042	5745.024	0.00042

5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

6 Appendix A – Radiated Emission Measurement

6.1.1 Limits of Radiated Emission Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table:

Frequencies (MHz)	Field strength (microvolts/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

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

6.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY51210105	July 24, 2015	July 23, 2016
Horn_Antenna AISI	AIH.8018	000032009111 0	Feb. 09, 2015	Feb. 08, 2016
Pre-Amplifier Agilent	8449B	3008A02578	June 23, 2015	June 22, 2016
RF Cable	NA	131205 131216 131217 SNMY23684/ 4	Jan. 16, 2015	Jan. 15, 2016
Spectrum Analyzer R&S	FSV40	100964	June 26, 2015	June 25, 2016
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Dec. 12, 2014	Dec. 11, 2015
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Feb. 05, 2015	Feb. 04, 2016
RF Cable	NA	329751/4 RF104-204	Dec. 11, 2014	Dec. 10, 2015
Software	ADT_Radiated _V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. G.
3. The FCC Site Registration No. is 966073.
4. The VCCI Site Registration No. is G-137.
5. The CANADA Site Registration No. is IC 7450H-2.
6. Tested Date: Sep. 23, 2015

6.1.3 Test Procedures

- a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1GHz) / 1.5 meters (for above 1GHz) above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

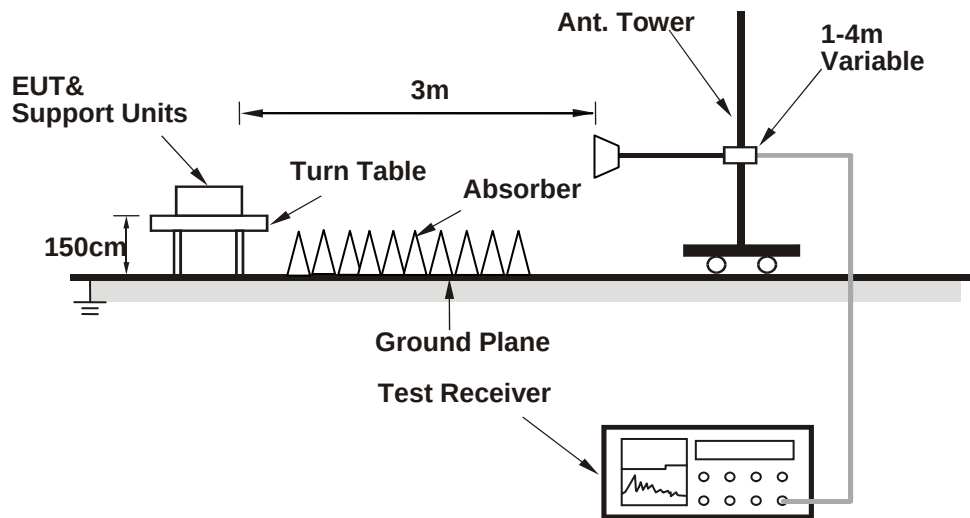
NOTE:

1. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average (Duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor ($10 \log(1/\text{duty cycle})$).
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

6.1.4 Deviation from Test Standard

No deviation

6.1.5 Test Setup



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

6.1.6 EUT Operating Conditions

Same as 4.4.6.

6.1.7 Test Results

In original report, the EUT's antenna had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Z-plane**.

802.11ac (VHT40)

CHANNEL	TX Channel 151	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5708.00	65.2 PK	68.2	-3.0	1.95 H	338	54.18	11.02
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5708.00	65.1 PK	68.2	-3.1	1.52 V	173	54.08	11.02

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 159	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5860.00	68.4 PK	74.0	-5.6	1.79 H	147	57.10	11.30
2	#5860.00	50.6 AV	54.0	-3.4	1.79 H	147	39.30	11.30
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5860.00	67.8 PK	74.0	-6.2	1.47 V	183	56.50	11.30
2	#5860.00	50.1 AV	54.0	-3.9	1.47 V	183	38.80	11.30

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " # ": The radiated frequency is out of the restricted band.

802.11ac (VHT80)

CHANNEL	TX Channel 155	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5702.00	65.1 PK	68.2	-3.1	1.82 H	339	54.10	11.00
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5702.00	65.2 PK	68.2	-3.0	1.51 V	173	54.20	11.00

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " # ": The radiated frequency is out of the restricted band.

7 Appendix B – Information on the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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Fax: 886-2-26051924

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Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

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