

 MOTOROLA SOLUTIONS	    CERTIFICATE 2518.08 MS ISO/IEC 17025 TESTING SAMM NO. 0825																												
MOTOROLA PENANG ADV. COMM. LABORATORY Motorola Solutions Malaysia Sdn. Bhd. Plot 2A Medan Bayan Lepas, Mukim 12, S.W.D. 11900 Bayan Lepas, Penang, Malaysia.	FCC / IC TEST REPORT Report Revision : Rev.G																												
<table><tr><td>Date/s Tested</td><td>: 26-Jun-2021 - 10-Jul-2021</td></tr><tr><td>Manufacturer/Location</td><td>: Motorola Solutions Malaysia SDN BHD</td></tr><tr><td>Manufacturer Address</td><td>: Plot 2A Medan Bayan Lepas, Mukim 12 SWD, 11900 Bayan Lepas, Penang, Malaysia</td></tr><tr><td>Requestor</td><td>: LIM KK</td></tr><tr><td>Product Type</td><td>: Hand-held</td></tr><tr><td>Product Version (PMN)</td><td>: Curve</td></tr><tr><td>Model Number (HVIN)</td><td>: DLR110NBHLAA (HVIN:DLR110NB1)</td></tr><tr><td>Frequency Band</td><td>: 5745-5875 MHz</td></tr><tr><td>Firmware Version (FVIN)</td><td>: D01.00.11</td></tr><tr><td>Applicant Name</td><td>: Motorola Solutions Inc</td></tr><tr><td>Applicant Address</td><td>: 8000 West Sunrise Boulevard, Fort Lauderdale, Florida 33322</td></tr><tr><td>FCC Registrations</td><td>: 461337</td></tr><tr><td>ISED Registrations</td><td>: MY0001</td></tr></table>  The equipment was tested accordance to the requirement listed below: <table><tr><td>(5GHz Wi-Fi) FCC 47 CFR Part 15 Subpart E IC RSS 247 Issue 2</td><td>PASS</td></tr></table>		Date/s Tested	: 26-Jun-2021 - 10-Jul-2021	Manufacturer/Location	: Motorola Solutions Malaysia SDN BHD	Manufacturer Address	: Plot 2A Medan Bayan Lepas, Mukim 12 SWD, 11900 Bayan Lepas, Penang, Malaysia	Requestor	: LIM KK	Product Type	: Hand-held	Product Version (PMN)	: Curve	Model Number (HVIN)	: DLR110NBHLAA (HVIN:DLR110NB1)	Frequency Band	: 5745-5875 MHz	Firmware Version (FVIN)	: D01.00.11	Applicant Name	: Motorola Solutions Inc	Applicant Address	: 8000 West Sunrise Boulevard, Fort Lauderdale, Florida 33322	FCC Registrations	: 461337	ISED Registrations	: MY0001	(5GHz Wi-Fi) FCC 47 CFR Part 15 Subpart E IC RSS 247 Issue 2	PASS
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Prepared By:  GAN BOON TEONG Test Personnel	Approved Signatory:  VINCENT FOONG CHUEN KIT Responsible Engineer																												

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REVISION HISTORY

Revision History	Description	Date	Originator
Rev. A	Initial Report	13-Jul-2021	Gan Boon Teong
Rev. B	Simplified summary table	15-Jul-2021	Vincent Foong
Rev. C	Antenna gain rectified	15-Jul-2021	Vincent Foong
Rev. D	Antenna gain updated	28-Jul-2021	Vincent Foong
Rev. E	Added ISED HVIN	6-Aug-2021	Vincent Foong
Rev. F	Updated PMN to Curve, power table	18-Aug-2021	Vincent Foong
Rev. G	Added statement in description of test modes	13-Sep-2021	Vincent Foong

1.0. Summary of Test Results

FCC Clause	IC Clause	Test Item	Result	Remarks	Serial Number tested	Tested by
15.407 (a)(1/2/3)	RSS 247 6.2	Maximum Conducted Output Power (Average)	Pass	Highest output power: 802.11a: 12.937 dBm (19.67mW) 802.11n20: 11.778 dBm (15.06mW) 802.11n40: 11.330 dBm (13.58mW)	55017XJ0046	Gan
15.407(a) (1/2/3)	RSS 247 6.2	Maximum Power Spectral Density	Pass	NA	55017XJ0046	Gan
15.407 (e)	RSS 247 6.2.4	6dB Bandwidth	Pass	a20: 16.828MHz (16M8D1D) n20: 17.934MHz (17M9D1D) n40: 35.866MHz (35M9D1D)	55017XJ0046	Gan
15.407 (g)	RSS Gen 6.11	Frequency Stability	Pass	NA	55017XJ0046	Gan
15.407 (b) (1/2/3/4/6)	RSS 247 6.2	Band Edge Radiated Spurious Emission Measurement	Pass	Worst case emission: No spur detected (noise floor)	55017XJ0059	Qawiman & Nazrin
15.407 (b) (1/2/3/4/6)	RSS 247 6.2	Radiated Spurious Emission Measurement	Pass	Worst case emission: 65.84dBuV/m (noise floor)	55017XJ0059	Qawiman & Nazrin
15.207 15.407 (b)(6)	RSS Gen 8.8	AC Powerline Conducted Emission	Pass	NA	NA	NA
15.203	-	Antenna requirement	Pass	Internal antenna is not accessible to the end-user	NA	NA

Measurement Uncertainty

Measurement	Frequency	Expended Uncertainty (k=1.96) (±)
AC Power Line Conducted Spurious Emission	150kHz ~ 30MHz	3.48 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1000MHz	5.88 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	5.84 dB
	18GHz ~ 40GHz	6.02 dB
Conducted Spurious Emissions	9kHz ~ 12.75GHz	2.82 dB
Frequency Stability	9kHz ~ 12.75GHz	0.0085 ppm
Audio Frequency Response / Low Pass Filter Response	300Hz – 20kHz	4.09 %
Modulation Limiting	300Hz – 3kHz	1.15 %
Occupied Bandwidth	9kHz ~ 12.75GHz	2.82 dB
Band Edge Conducted Spurious Emission	9kHz ~ 12.75GHz	2.82 dB
Transient Frequency Behavior	9kHz ~ 12.75GHz	5.4 ms
Adjacent Channel Power	9kHz ~ 12.75GHz	2.82 dB

2.0. Equipment List

Bluetooth ATE # 1 (SW Version: Ate Main_3.1.11)

Description	Model	Serial Number	Calibration Date	Calibration Due Date
CHAMBER	SH-641	92002639	8-Dec-20	8-Dec-21
POWER SUPPLY	6652A	3640A02941	22-Jan-21	22-Jan-22
SPECTRUM ANALYZER	E4445A	MY45301089	7-Sep-19	7-Sep-21
N to N RF Cable # 1	SF126/11N/11N	NA	NA	NA

Radiated Emission Station (SW Version: EMC FCC RE v1.6.2)

Description	Model	Serial Number	Calibration Date	Calibration Due Date
DRG HORN FREQ.	SAS-571	719	20-Aug-19	20-Aug-21
DRG HORN FREQ.	SAS-571	566	22-Oct-19	22-Oct-21
POWER SUPPLY	6031A	MY41000626	23-Jul-20	23-Jul-21
SIGNAL GENERATOR	SMB 100A	181117	8-Nov-18	8-Nov-21
EMI TEST RECEIVER	ESW44	101750	15-Jan-21	15-Jan-22
EMI TEST RECEIVER	ESIB26	827769/009	11-Mar-21	11-Mar-22
5m SEMI-ANECHOIC CHAMBER	S800-HX	J2308	Not Required	Not Required
BILOG ANTENNA	CBL6112B	30991	20-Aug-20	20-Aug-21
BILOG ANTENNA	CBL6112B	2950	8-Jul-19	8-Jul-21
HYGRO-THERMOMETER	SDL500	A.016800	18-May-21	18-May-22
SYSTEM CONTROLLER	SC104V	050806-1	Not Required	Not Required
TURNTABLE FLUSH MOUNT 2M	FM2011	NA	Not Required	Not Required
ANTENNA POSITIONING TOWER	TLT2	NA	Not Required	Not Required
BROAD-BAND HORN ANTENNA	BBHA9170	BBHA9170143	15-Jul-20	15-Jul-21
18 - 40GHz PREAMPLIFIER	MITEQ Hi GAIN SUCOFLEX	2006313	Not Required	Not Required
PREAMPLIFIER	PAM-0118	269	24-May-19	24-May-22
LOOP ANTENNA	6502	00208416	15-Sep-20	15-Sep-21

3.0. General Information

General Description of EUT:

Product	Hand-held
Brand	Motorola Solutions
Test Model	Curve
Power Supply Rating	3.7Vdc
Mode of operation	WLAN 5GHz
Modulation Type	QPSK, BPSK, 16QAM, 64QAM, 256QAM
Modulation Technology	OFDM
Transfer Rate	802.11a: 6.0/9.0/12.0/18.0/24.0/36.0/48.0/54.0 Mbps 802.11n: up to MCS15 802.11ac: up to MCS9
Operating Frequency	5.745 ~ 5.825 GHz
Output Power (26 EBW or 99% OBW)	22.39 mW for 5.745 ~ 5.825 GHz
Antenna Type	IFA with 3.06dBi gain

Note:

The EUT contains following accessory devices and data cable:

Item	Brand	Model or P/N
Curve SUC TRAY	MOTOROLA	PMPN4586A
BATTERY PACK,BATTERY PACK, BATT LIION 2500T	MOTOROLA	PMNN4578A

Description of Test Modes:

***NOTE: Channel list is generic. Testing will be conducted on the channels supported by the UUT only.**

For 5180 to 5240 MHz:

Channels for 802.11a, 802.11n, 802.11ac (HT20, VHT20)

Channel	Frequency (MHz)
36	5180
40	5200
44	5220
48	5240

Channels for 802.11n, 802.11ac (HT40, VHT40)

Channel	Frequency (MHz)
38	5190
46	5230

Channels for 802.11ac (VHT80)

Channel	Frequency (MHz)
42	5210

For 5260 to 5320 MHz:

Channels for 802.11a, 802.11n, 802.11ac (HT20, VHT20)

Channel	Frequency (MHz)
52	5260
56	5280
60	5300
64	5320

Channels for 802.11n, 802.11ac (HT40, VHT40)

Channel	Frequency (MHz)
54	5270
62	5310

Channels for 802.11ac (VHT80)

Channel	Frequency (MHz)
58	5290

For 5500 to 5720 MHz:

Channels for 802.11a, 802.11n, 802.11ac (HT20, VHT20)

Channel	Frequency (MHz)
100	5500
104	5520
108	5540
112	5560
116	5580
120	5600
124	5620
128	5640
132	5660
136	5680
140	5700
144	5720

Channels for 802.11n, 802.11ac (HT40, VHT40)

Channel	Frequency (MHz)
102	5510
110	5550
118	5590
126	5630
134	5670
142	5710

Channels for 802.11ac (VHT80)

Channel	Frequency (MHz)
106	5530
122	5610
138	5690

For 5745 to 5825 MHz:

Channels for 802.11a, 802.11n, 802.11ac (HT20, VHT40)

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

Channels for 802.11n, 802.11ac (HT40, VHT40)

Channel	Frequency(MHz)
151	5755
159	5795

Channels for 802.11ac (VHT80)

Channel	Frequency (MHz)
155	5775

General Description of Applied Standards

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

FCC Part15, Subpart E (15.407)

789033 D02 General UNII Test Procedures New Rules v01r04

644545 D03 Guidance for IEEE 802 11ac New Rules v01

ANSI C63.10-2013

RSS 247 Issue 2, RSS Gen

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

Deviation from standard

Not applicable as no deviation from standard test method

Modifications to EUT

A pigtail was soldered out of the EUT for RF conducted measurements. The EUT used for EMC testing was not modified

Antenna gain disclaimer

Antenna gain information is provided by customer. The validity of the results is dependent upon this information. The lab will not be held accountable in the event the supplied information affects compliance.

4.0. Test Mode Applicability and Test Channel Detail

EUT Configure Mode	Applicable to				Description
	RE $\geq$ 1G	RE<1G	PLC	APCM	
A	√	√	√	√	Power from adapter
B	x	√	x	x	Power from carcharger (12Vdc)
C	x	√	x	x	Power from carcharger (24Vdc)

Where:

RE $\geq$ 1G: Radiated Emission above 1GHz & Band edge Measurement

RE<1G: Radiated Emission below 1GHz

PLC: Power Line Conducted Emission

APCM: Antenna Port Conducted Measurement

Note: The EUT had been pre-scanned on the position of each 3 axis planes. The worst case was found when positioned on **Y-plane**.

Radiated 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.

EUT Configure Mode	Frequency Band	MODE	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	5180-5240	802.11a	36-48	36,44,48	OFDM	BPSK	6.0
-	5180-5240	802.11n/ac (HT20, VHT20)	36-48	36,44,48	OFDM	BPSK	6.5
-	5180-5240	802.11n/ac (HT40,VHT40)	38-46	38,46	OFDM	BPSK	13.5
-	5180-5240	802.11ac (VHT80)	42	42	OFDM	BPSK	29.3
-	5260-5320	802.11a	52-64	52,60,64	OFDM	BPSK	6.0
-	5260-5320	802.11n/ac (HT20, VHT20)	52-46	52,60,64	OFDM	BPSK	6.5
-	5260-5320	802.11n/ac (HT40,VHT40)	54-62	54,62	OFDM	BPSK	13.5
-	5260-5320	802.11ac (VHT80)	58	58	OFDM	BPSK	29.3
-	5500-5700	802.11a	100-140	100,116,140	OFDM	BPSK	6.0
-	5500-5720	802.11n/ac (HT20, VHT20)	100-144	100,116,144	OFDM	BPSK	6.5
-	5500-5720	802.11n/ac (HT40,VHT40)	102-142	102,110,142	OFDM	BPSK	13.5
-	5500-5720	802.11ac (VHT80)	106-138	106,122,138	OFDM	BPSK	29.3
-	5745-5825	802.11a	149-165	149,157,165	OFDM	BPSK	6.0
-	5745-5825	802.11n/ac (HT20, VHT20)	149-165	149,157,165	OFDM	BPSK	6.5
-	5745-5825	802.11n/ac (HT40,VHT40)	151-159	151,159	OFDM	BPSK	13.5
-	5745-5825	802.11ac (VHT80)	155	155	OFDM	BPSK	29.3

Radiated 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.

EUT Configure Mode	MODE	Frequency band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11a	5180-5240	36 to 48	36	OFDM	BPSK	6.0
-	802.11a	5260-5320	52 to 64		OFDM	BPSK	6.0
-	802.11a	5500-5700	100 to 140		OFDM	BPSK	6.0
-	802.11a	5745-5825	149 to 165		OFDM	BPSK	6.0

Power Line Conducted Emission Test

☒ 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.

EUT Configure Mode	MODE	Frequency band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11a	5180-5240	36 to 48	36	OFDM	BPSK	6.0
-	802.11a	5260-5320	52 to 64		OFDM	BPSK	6.0
-	802.11a	5500-5700	100 to 140		OFDM	BPSK	6.0
-	802.11a	5745-5825	149 to 165		OFDM	BPSK	6.0

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.

EUT Configure Mode	Frequency Band	MODE	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	5180-5240	802.11a	36-48	36,44,48	OFDM	BPSK	6.0
-	5180-5240	802.11n/ac (HT20, VHT20)	36-48	36,44,48	OFDM	BPSK	6.5
-	5180-5240	802.11n/ac (HT40,VHT40)	38-46	38,46	OFDM	BPSK	13.5
-	5180-5240	802.11ac (VHT80)	42	42	OFDM	BPSK	29.3
-	5260-5320	802.11a	52-64	52,60,64	OFDM	BPSK	6.0
-	5260-5320	802.11n/ac (HT20, VHT20)	52-46	52,60,64	OFDM	BPSK	6.5
-	5260-5320	802.11n/ac (HT40,VHT40)	54-62	54,62	OFDM	BPSK	13.5
-	5260-5320	802.11ac (VHT80)	58	58	OFDM	BPSK	29.3
-	5500-5700	802.11a	100-140	100,116,140	OFDM	BPSK	6.0
-	5500-5720	802.11n/ac (HT20, VHT20)	100-144	100,116,144	OFDM	BPSK	6.5
-	5500-5720	802.11n/ac (HT40,VHT40)	102-142	102,110,142	OFDM	BPSK	13.5
-	5500-5720	802.11ac (VHT80)	106-138	106,122,138	OFDM	BPSK	29.3
-	5745-5825	802.11a	149-165	149,157,165	OFDM	BPSK	6.0
-	5745-5825	802.11n/ac (HT20, VHT20)	149-165	149,157,165	OFDM	BPSK	6.5
-	5745-5825	802.11n/ac (HT40,VHT40)	151-159	151,159	OFDM	BPSK	13.5
-	5745-5825	802.11ac (VHT80)	155	155	OFDM	BPSK	29.3

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested By
RE≥1G	23.3°C, 69.5% RH	3.7V DC	Nazrin/Qawiman
RE<1G	23.3°C, 69.5% RH	3.7V DC	Nazrin/Qawiman
PLC	23.3°C, 69.5% RH	NA	NA
APCM	25°C, 50% RH	3.7V DC	Gan

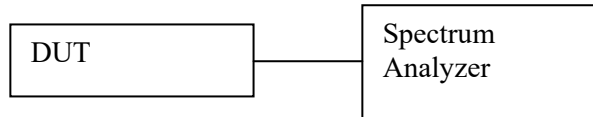
Duty Cycle of Test Signal

802.11a, 802.11n and 802.11ac (HT20, VHT20): Duty cycle of test signal is <98%.

If Duty cycle of test signal is <98%, duty cycle factor shall be considered. (Refer to section 6.0 for duty cycle measurement)

5.0. Duty Cycle of Test Signal

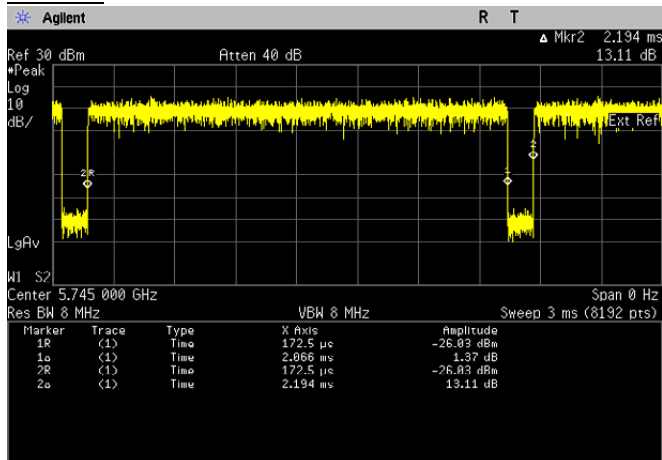
5.0.1. Test Setup



- 1) Set DUT to desire transmit frequency and transmit with maximum power.
- 2) Connect DUT's antenna terminal to spectrum analyzer with a low loss cable.
- 3) Setting of Spectrum analyzer :
 - a. Set the RBW = 10 MHz or the highest RBW available on spectrum analyzer.
 - b. Set the VBW ≥ RBW.
 - c. Set to Zero Span.
 - d. Detector = Peak.
 - e. Sweep time = 10ms or others that allow to measure accurate duty cycle.
 - f. Trace mode = Max hold.
- 4) Record the duty cycle as X and save the plot.

5.0.2. Test Data

802.11a

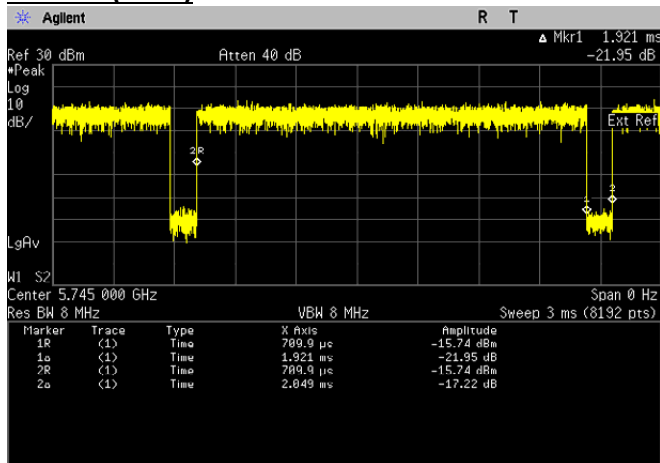


On time	2.066	ms
On + off time	2.194	ms
Duty Cycle	0.9417	
Duty Cycle Factor	0.261	

*Duty cycle = On time/ On +off time

*Duty Cycle factor = 10*log (1/Duty Cycle)

802.11n (HT20)

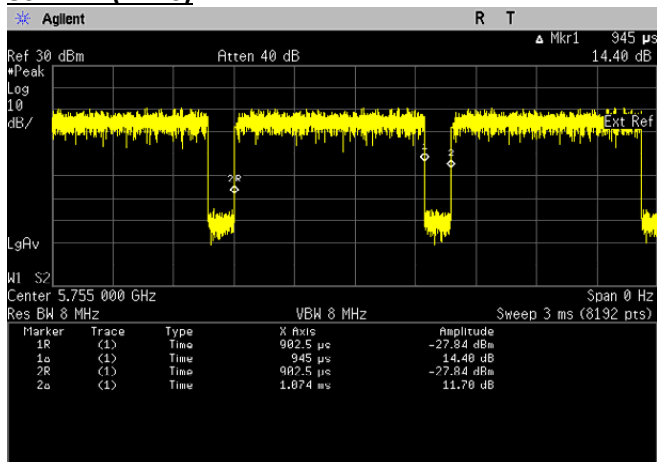


On time	1.921	ms
On + off time	2.049	ms
Duty Cycle	0.9375	
Duty Cycle Factor	0.280	

*Duty cycle = On time/ On +off time

*Duty Cycle factor = $10 \cdot \log(1/\text{Duty Cycle})$

802.11n (HT40)



On time	0.945	ms
On + off time	1.074	ms
Duty cycle	0.8799	
Duty Cycle factor	0.556	

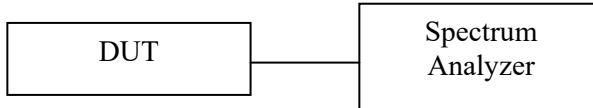
*Duty cycle = On time/ On +off time

*Duty Cycle factor = $10 \cdot \log(1/\text{Duty Cycle})$

6.0. Transmitter Test Parameters

6.1. Bandwidth measurements

6.1.1. Test Setup



- a) Test Setup as per illustrated above.
- b) Set DUT to transmit at desire transmit frequency.
- c) Connect DUT's antenna terminal to spectrum analyzer with a low loss cable.
- d) Setting of Spectrum analyzer for 26dB EBW:
 - RBW = approximate 1% of emission bandwidth
 - VBW > RBW
 - Detector = Peak
 - Trace =Max hold
 - Measure the maximum width of the emission that is 26 dB down from the maximum 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%.
- e) Setting of Spectrum analyzer for 99% Occupied bandwidth:
 - Span = 1.5 times to 5.0 times the OBW
 - RBW = 1% to 5 % of the OBW
 - VBW $\geq 3 \cdot$ RBW
 - Detector = Peak
 - Trace = Max Hold
 - Use the 99% power bandwidth function of the instrument
- f) The measurement method follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r04 under clause C.1) & D).

6.1.2. Test Limits

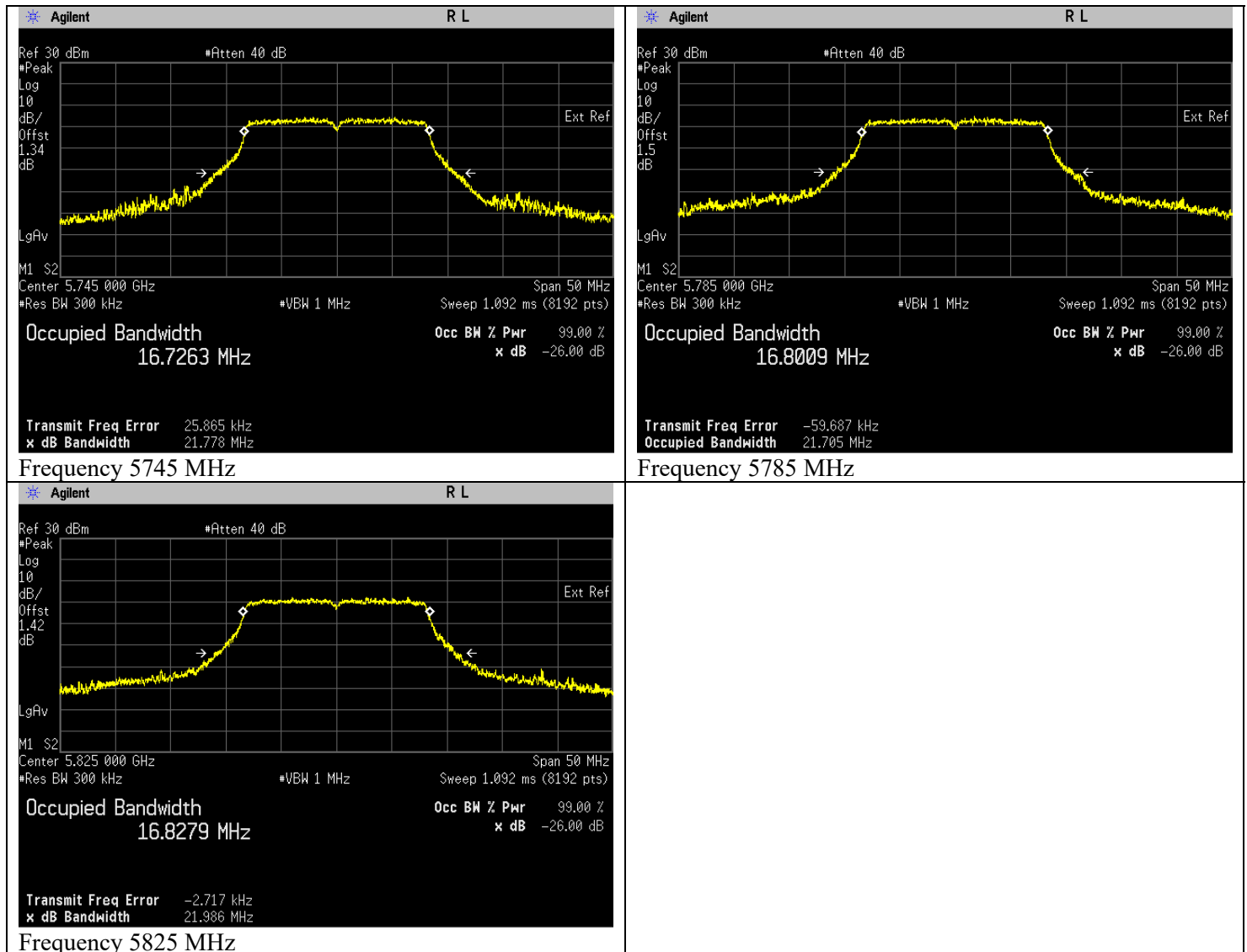
Not applicable.

6.1.3. Test Data

802.11a

Frequency (MHz)	Test Configuration	Results			
		26 dB Bandwidth(MHz)	Status	99% Bandwidth(MHz)	Status
5745	BPSK, Data Rate: 6	21.778	Pass	16.724	Pass
5785	BPSK, Data Rate: 6	21.705	Pass	16.801	Pass
5825	BPSK, Data Rate: 6	21.986	Pass	16.828	Pass

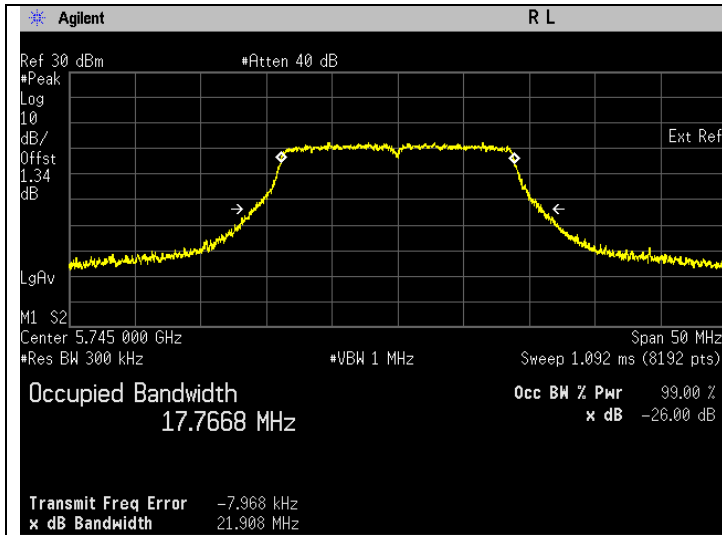
26 dB Bandwidth/ 99% Bandwidth



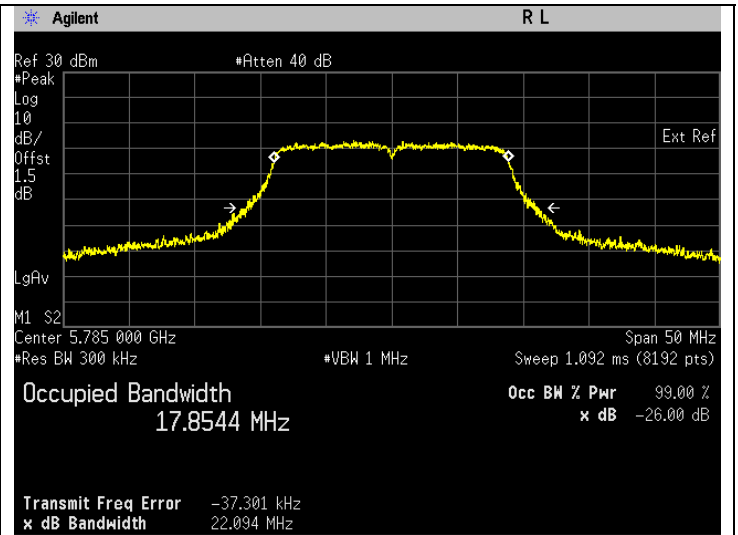
802.11n (HT20)

Frequency (MHz)	Test Configuration	Results			
		26 dB Bandwidth(MHz)	Status	99% Bandwidth(MHz)	Status
5745	BPSK, Data Rate: MCS0 (6.5)	21.908	Pass	17.767	Pass
5785	BPSK, Data Rate: MCS0 (6.5)	22.094	Pass	17.855	Pass
5825	BPSK, Data Rate: MCS0 (6.5)	23.052	Pass	17.934	Pass

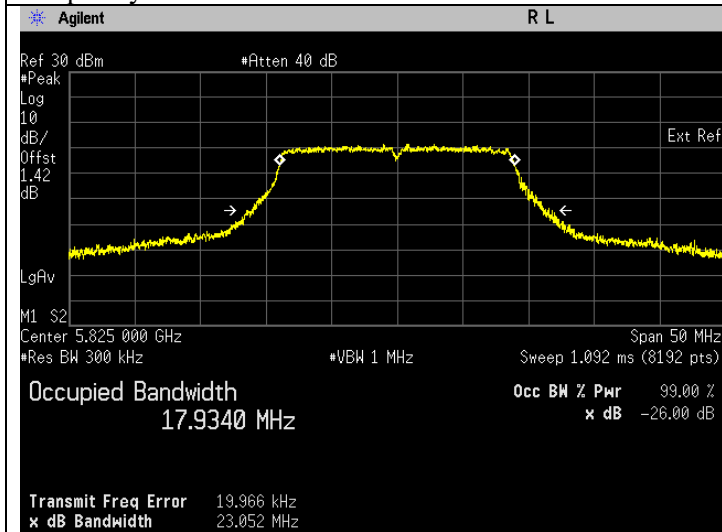
26 dB Bandwidth/ 99% Bandwidth



Frequency 5745 MHz



Frequency 5785 MHz

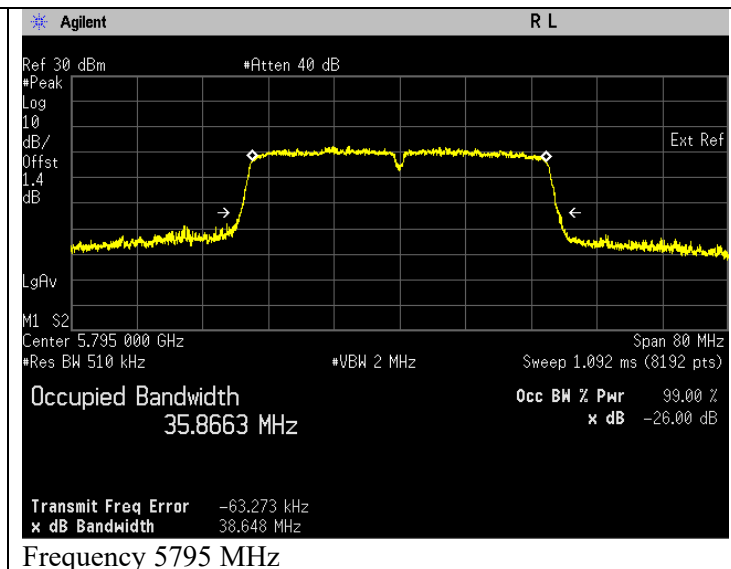
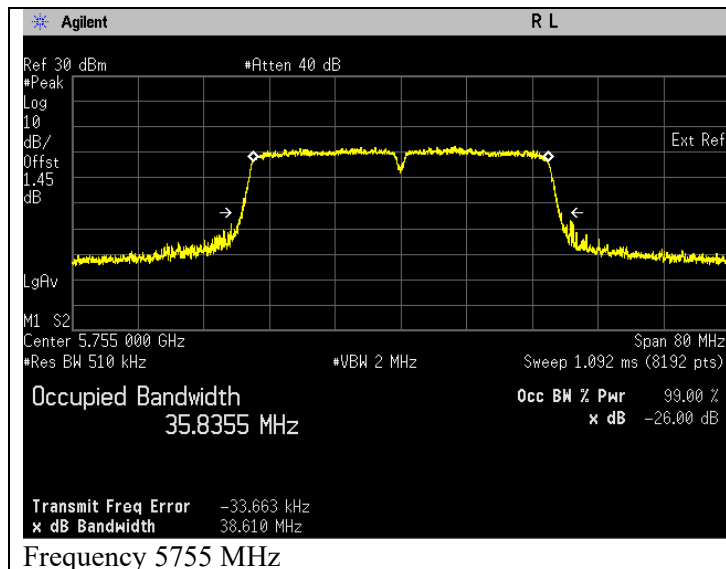


Frequency 5825 MHz

802.11n (HT40)

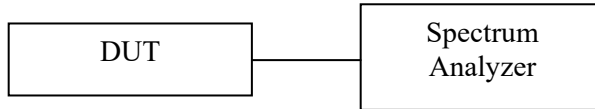
Frequency (MHz)	Test Configuration	Results			
		26 dB Bandwidth(MHz)	Status	99% Bandwidth(MHz)	Status
5755	BPSK, Data Rate: MCS0 (13.5)	38.852	Pass	35.836	Pass
5795	BPSK, Data Rate: MCS0 (13.5)	38.648	Pass	35.866	Pass

26 dB Bandwidth/ 99% Bandwidth



6.2. Maximum Conducted Output Power

6.2.1. Test Setup



- Test setup as per illustrated above.
- Set DUT to transmit at desire transmit frequency.
- Connect DUT's antenna terminal to spectrum analyzer with a low loss cable.
- Setting of Spectrum analyzer :
 - Span to encompass the entire 26dB EBW or 99% Occupied Bandwidth.
 - RBW = 1 MHz
 - VBW $\geq$ 3 MHz
 - Detector = power averaging (RMS)
 - Trace = Max hold
 - Number of points in sweep $\geq 2 \times \text{span} / \text{RBW}$
 - Sweep time = auto
 - Trace average at least 100 traces in power averaging (rms) mode
 - Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument's band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges.
 - Add $10 \log (1/x)$, where x is the duty cycle, to the measured power to compute the average power during the actual transmission times
- The measurement method follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r04 under clause E.2.d) Method SA-2.
- The Maximum output power results are included duty cycle correction factor.

6.2.2. Test Limits

FCC 15.407(a)

Range(GHz)	Condition	Output Power Limit
5.15-5.25 (UNII-1)	Outdoor AP	$\leq 1\text{W}$
	Indoor AP	$\leq 1\text{W}$
	Fixed Point to Point AP	$\leq 1\text{W}$
	√ Mobile and Portable client devices	$\leq 250\text{mW}$
5.25-5.35 (UNII-2A)	√	$\leq 250\text{mW}$ or $11\text{dBm} + 10\log_{10} B^*$
5.47-5.525 (UNII-2C)	√	*B is 26dB emission bandwidth in MHz
5.725-5.85 (UNII-3)	√	$\leq 1\text{W}$

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Range(GHz)	Condition	Output Power Limit
5.15-5.25	indoor only (e.i.r.p.)	$\leq 200\text{mW}$ or $10+10\log_{10}B^*$ *B is 99% emission bandwidth in 1MHz
5.25-5.35	(Conducted & e.i.r.p.)	Conducted: $\leq 250\text{mW}$ or $11+10\log_{10}B^*$ EIRP: $< 1.0\text{W}$ or $17+10\log_{10}B^*$ *B is 99% emission bandwidth in 1MHz
5.47-5.6 5.65-5.725	(Conducted & e.i.r.p.)	Conducted: $\leq 250\text{mW}$ or $11+10\log_{10}B^*$ EIRP: $< 1.0\text{W}$ or $17+10\log_{10}B^*$ *B is 99% emission bandwidth in 1MHz
5.725-5.85	(Conducted)	$\leq 1\text{W}$

6.2.3. Additional Info

Antenna	Gain (dBi)
Antenna 1	3.06
Duty Cycle Correction Factor	
802.11a	0.261
802.11n20	0.280
802.11n40	0.556

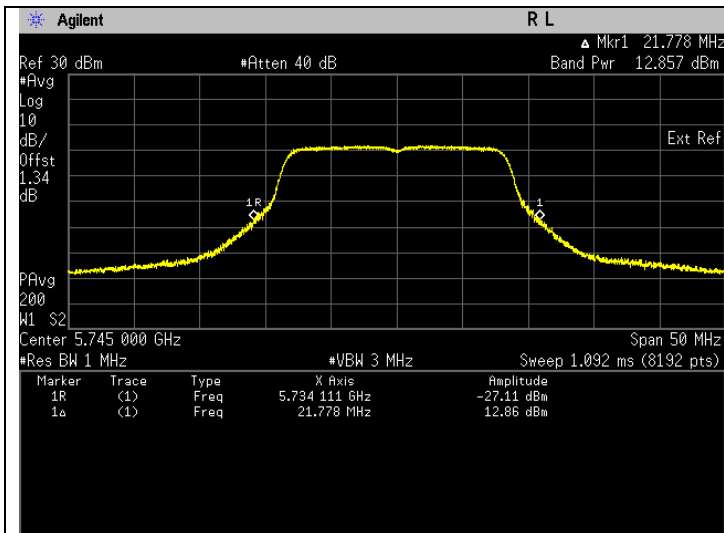
6.2.4. Test Data

Summary table

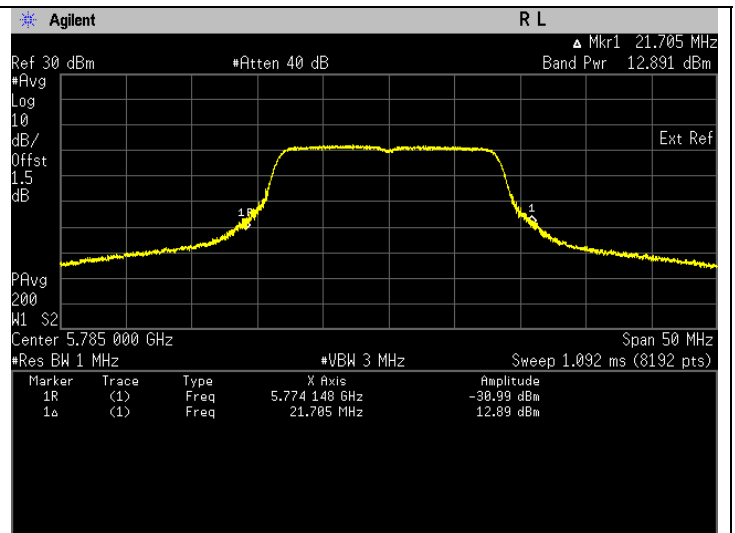
WLAN	Frequency Range (MHz)	Bandwidth (MHz)	RF Power Output		EIRP	
			Max measured (mW)	Max declared (mW)	Max measured (mW)	Max declared (mW)
802.11a	5745-5805	20	19.67	22.39	39.78	45.29
	5825	20	11.8	12.59	21.69	25.47
802.11n	5745-5805	20	15.06	16.98	30.46	34.36
	5825	20	10.65	12.59	21.55	25.47
802.11n	5755-5795	40	13.58	15.85	27.48	32.06

802.11a (26dB EBW)

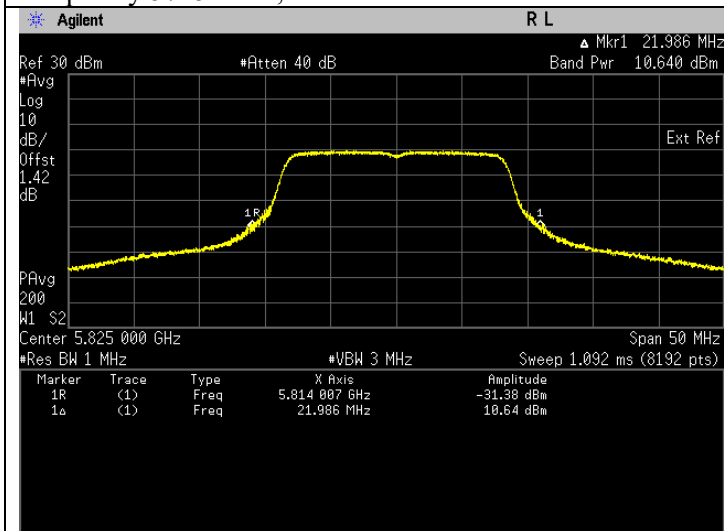
Freq. (MHz)	Test Conditions	Results		
		Power (mW)	Power (dBm)	Status
5745	BPSK, Data Rate: 6	20.502	13.118	Pass
5785	BPSK, Data Rate: 6	20.663	13.152	Pass
5825	BPSK, Data Rate: 6	12.305	10.901	Pass



Frequency 5745 MHz, FCC.



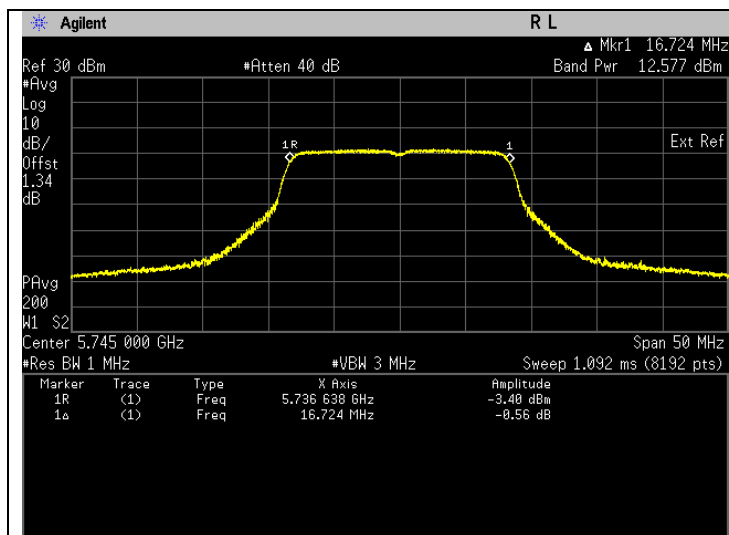
Frequency 5785 MHz, FCC.



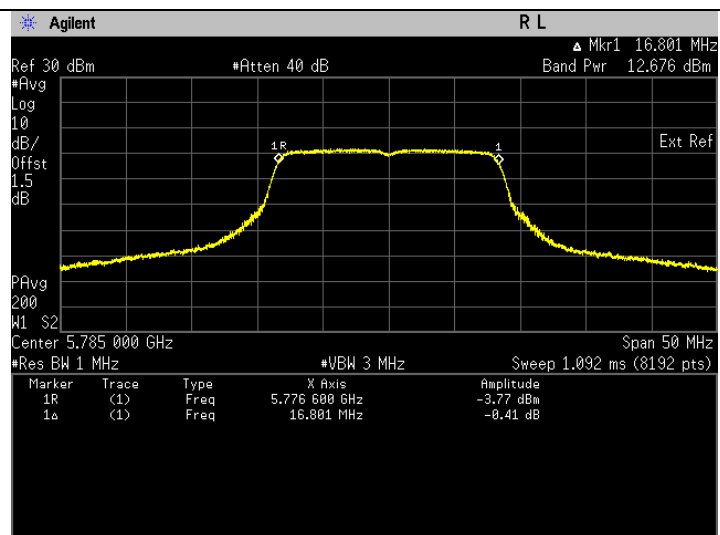
Frequency 5825 MHz, FCC.

802.11a (99% EBW)

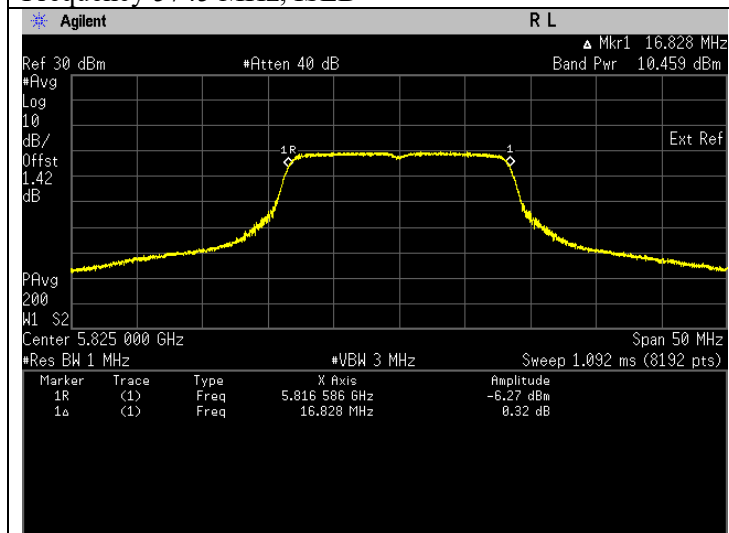
Freq. (MHz)	Test Conditions	Results				
		Power (mW)	Power (dBm)	Status	EIRP (dBm)	Status
5745	BPSK, Data Rate: 6	19.222	12.838	Pass	15.898	Pass
5785	BPSK, Data Rate: 6	19.665	12.937	Pass	15.997	Pass
5825	BPSK, Data Rate: 6	11.803	10.720	Pass	13.780	Pass



Frequency 5745 MHz, ISED



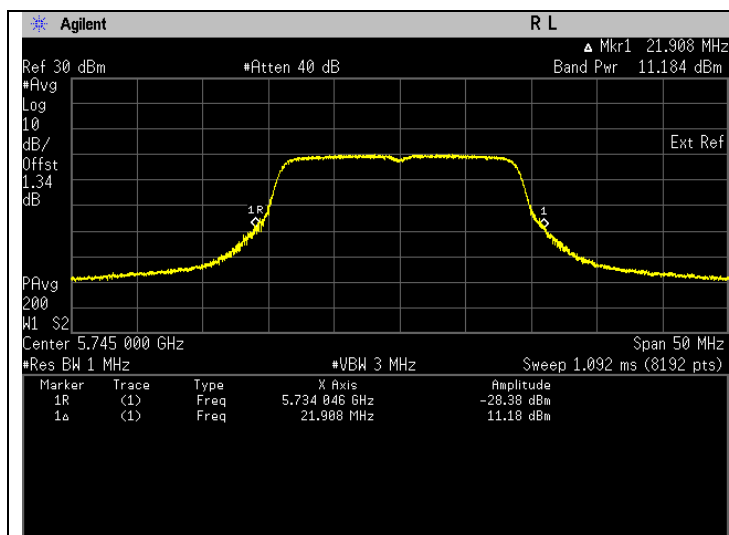
Frequency 5785 MHz, ISED



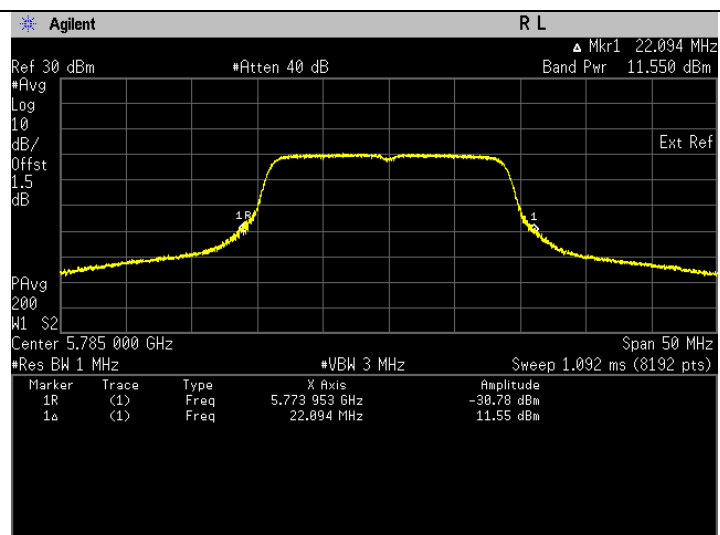
Frequency 5825 MHz, ISED

802.11n (HT20)(26dB EBW)

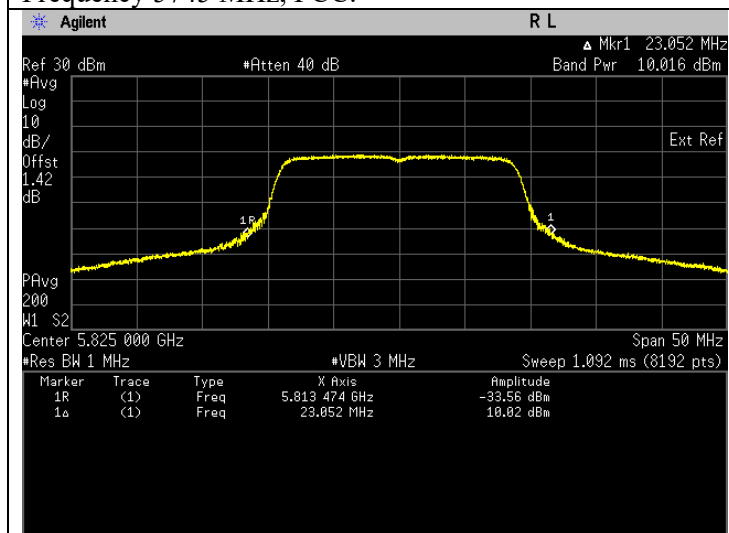
Freq. (MHz)	Test Conditions	Results		
		Power (mW)	Power (dBm)	Status
5745	BPSK, Data Rate: MCS0 (6.5)	14.010	11.464	Pass
5785	BPSK, Data Rate: MCS0 (6.5)	15.242	11.830	Pass
5825	BPSK, Data Rate: MCS0 (6.5)	10.706	10.296	Pass



Frequency 5745 MHz, FCC.



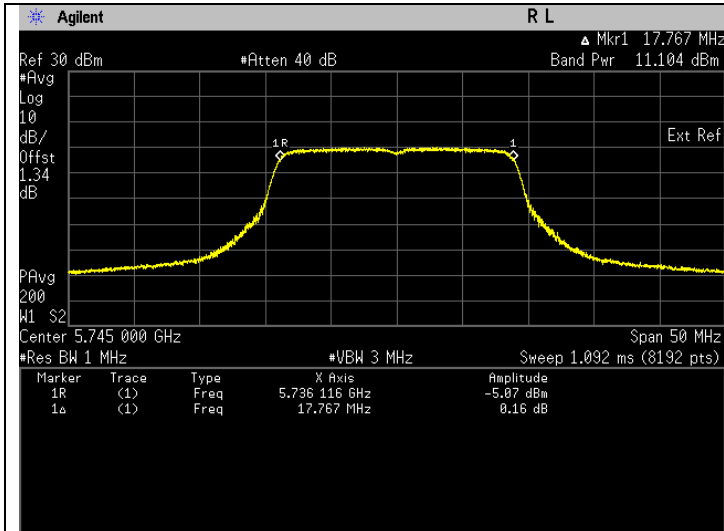
Frequency 5785 MHz, FCC.



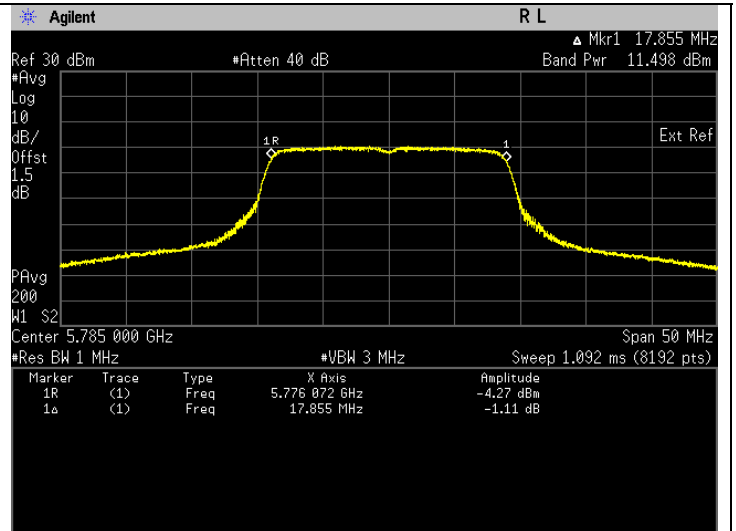
Frequency 5825 MHz, FCC.

802.11n (HT20)(99% EBW)

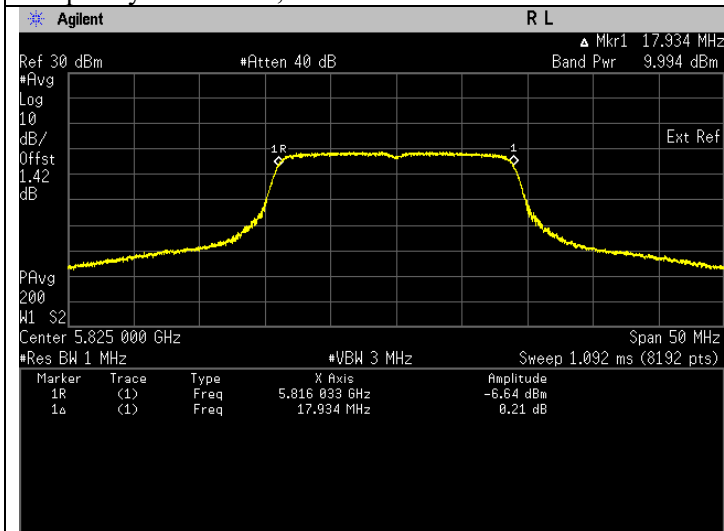
Freq. (MHz)	Test Conditions	Results				
		Power (mW)	Power (dBm)	Status	EIRP (dBm)	Status
5745	BPSK, Data Rate: MCS0 (6.5)	13.754	11.384	Pass	14.444	Pass
5785	BPSK, Data Rate: MCS0 (6.5)	15.060	11.778	Pass	14.838	Pass
5825	BPSK, Data Rate: MCS0 (6.5)	10.652	10.274	Pass	13.334	Pass



Frequency 5745 MHz, ISED



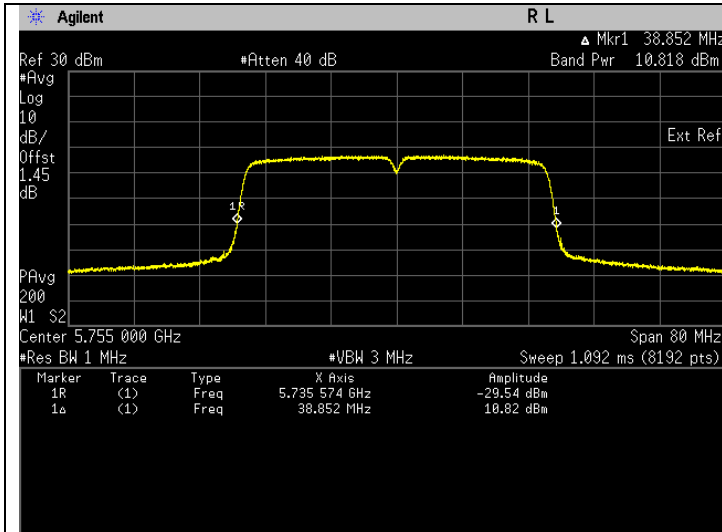
Frequency 5785 MHz, ISED



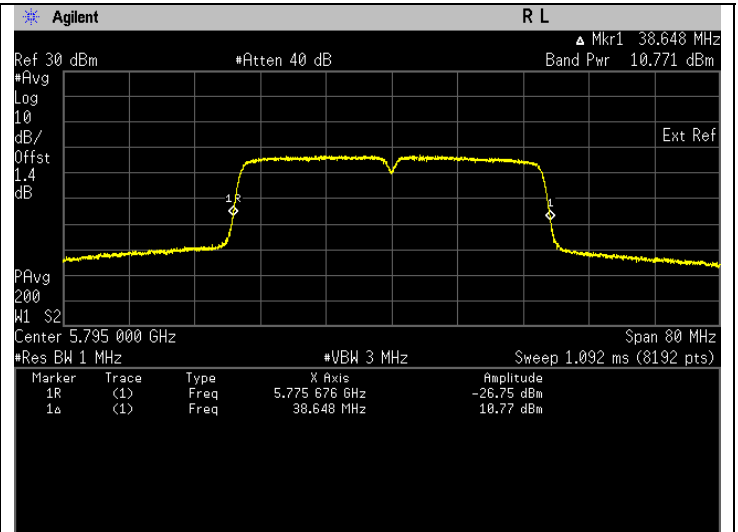
Frequency 5825 MHz, ISED

802.11n (HT40)(26dB EBW)

Freq. (MHz)	Test Conditions	Results		
		Power (mW)	Power (dBm)	Status
5755	BPSK, Data Rate: MCS0 (13.5)	13.720	11.374	Pass
5795	BPSK, Data Rate: MCS0 (13.5)	13.573	11.327	Pass



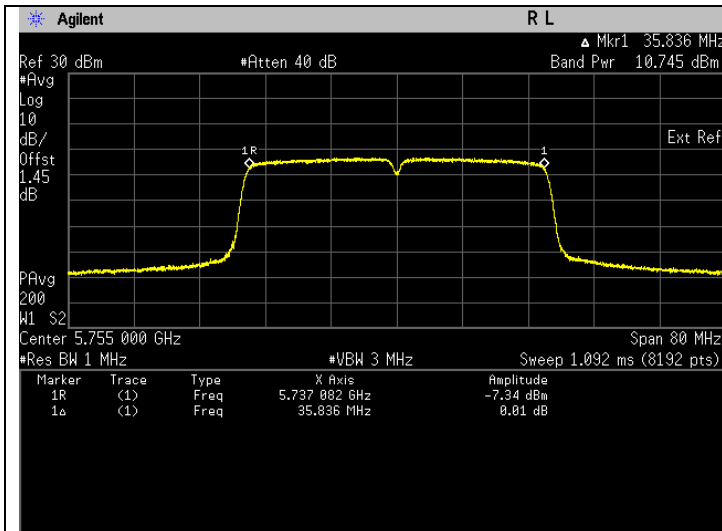
Frequency 5755 MHz, FCC.



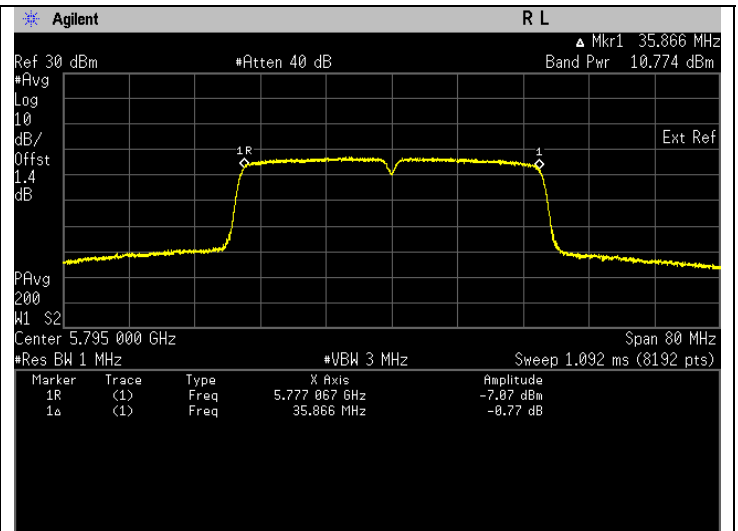
Frequency 5795 MHz, FCC.

802.11n (HT40)(99% EBW)

Freq. (MHz)	Test Conditions	Results				
		Power (mW)	Power (dBm)	Status	EIRP (dBm)	Status
5755	BPSK, Data Rate: MCS0 (13.5)	13.492	11.301	Pass	14.361	Pass
5795	BPSK, Data Rate: MCS0 (13.5)	13.582	11.330	Pass	14.390	Pass



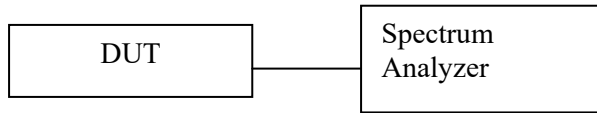
Frequency 5755 MHz, ISED



Frequency 5795 MHz, ISED

6.3. Maximum Power Spectral Density

6.3.1. Test Setup



- a) Test setup as per illustrated above.
- b) Set DUT to transmit at desire transmit frequency.
- c) Connect DUT's antenna terminal to spectrum analyzer with a low loss cable.
- d) Setting of Spectrum analyzer :
 - Span to encompass the entire 26dB EBW or 99% occupied bandwidth.
 - RBW = 1 MHz (5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz) / 500 kHz (5.725-5.85 GHz)
 - VBW $\geq 3 \cdot$ RBW
 - Detector = power averaging (RMS)
 - Trace = Max hold
 - Number of points in sweep $\geq 2 \times$ span / RBW
 - Sweep time = auto
 - Trace average at least 100 traces in power averaging (rms) mode
- e) Use the peak search function on the instrument to find the peak of the spectrum and record its value.
- f) Add $10 \log (1/x)$, where x is the duty cycle, to the peak of the spectrum.
- g) The measurement method follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r04 under clause F) Method SA-2.
- h) The Maximum power spectral density results are included duty cycle correction factor.

6.3.2. Test Limits

FCC 15.407(a)

Range (GHz)	Condition	Limit
5.15-5.25	Outdoor AP	17dBm/ 1MHz
	Indoor AP	17dBm/ 1MHz
	Fixed Point to Point AP	17dBm/ 1MHz
	√ Mobile and Portable Client Devices	11dBm/ 1MHz
5.25-5.35	√	11dBm/ 1MHz
5.47-5.525	√	11dBm/ 1MHz
5.725-5.85	√	30dBm/ 500kHz

RSS-247 6.2

Range(GHz)	Condition	Limit
5.15-5.25	Indoor Operation Only	EIRP: 10dBm/ 1MHz
5.25-5.35		11dBm/ 1MHz
5.47-5.6 5.6-5.525		11dBm/ 1MHz
5.725-5.85		30dBm/ 500kHz

6.3.3. Additional Info

Antenna	Gain (dBi)
Antenna 1	3.06
Duty Cycle Correction Factor	
802.11a	0.261
802.11n20	0.280
802.11n40	0.556

6.3.4. Test Data

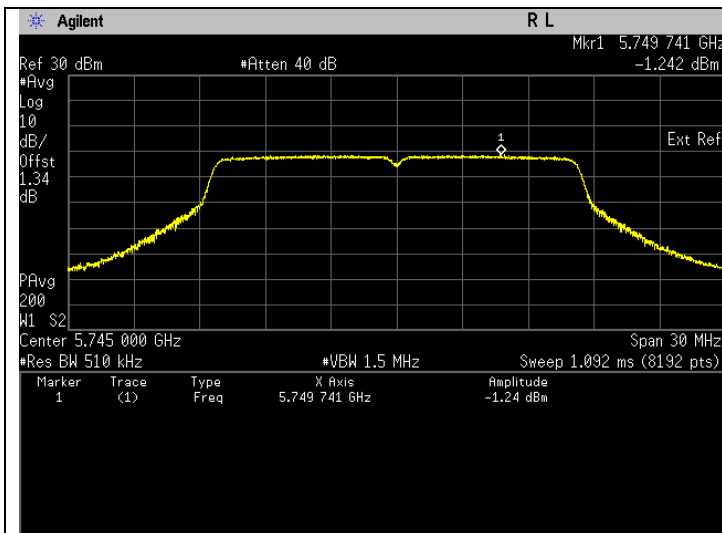
802.11a (26dB EBW)

Freq. (MHz)	Test Conditions	Power/Frequency (dBm/500kHz)	Status
5745	BPSK, Data Rate: 6	-0.981	Pass
5785	BPSK, Data Rate: 6	-0.930	Pass
5825	BPSK, Data Rate: 6	-3.092	Pass

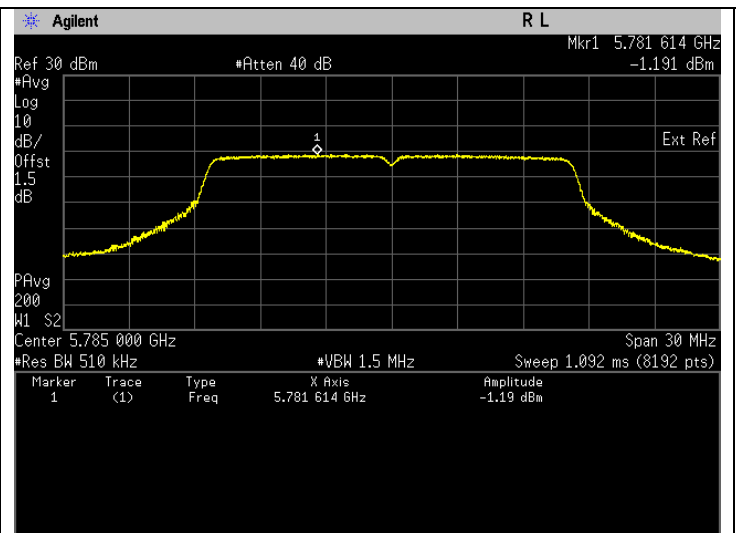
802.11a (99% EBW)

Freq. (MHz)	Test Conditions	Power/Frequency (dBm/500kHz)	Status	EIRP (dBm/500kHz)	Status
5745	BPSK, Data Rate: 6	-0.981	Pass	2.079	Pass
5785	BPSK, Data Rate: 6	-0.930	Pass	2.130	Pass
5825	BPSK, Data Rate: 6	-3.092	Pass	-0.032	Pass

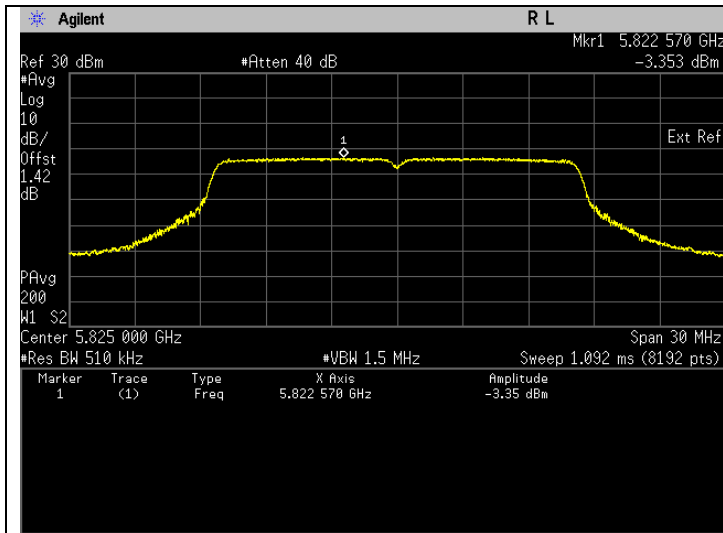
Plots for 802.11a (26dB EBW & 99% EBW)



Frequency 5745 MHz, FCC & ISSED.



Frequency 5785 MHz, FCC & ISSED.



Frequency 5825 MHz, FCC & ISSED.

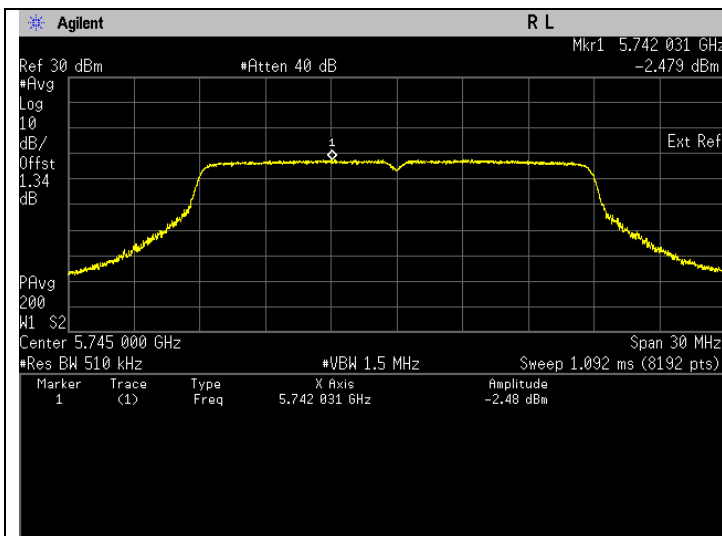
802.11n (HT20)(26dB EBW)

Freq. (MHz)	Test Conditions	Results	
		Power/Frequency (dBm/MHz)	Status
Freq. (MHz)	Test Conditions	Power/Frequency (dBm/500kHz)	Status
5745	BPSK, Data Rate: MCS0 (6.5)	-2.199	Pass
5785	BPSK, Data Rate: MCS0 (6.5)	-1.991	Pass
5825	BPSK, Data Rate: MCS0 (6.5)	-3.500	Pass

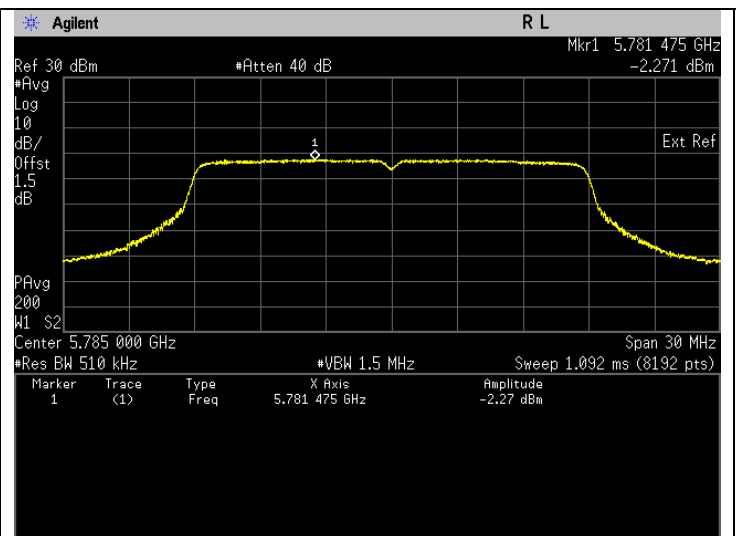
802.11n (HT20)(99% EBW)

Freq. (MHz)	Test Conditions	Power/Frequency (dBm/500kHz)	Status	EIRP (dBm/MHz)	Status
5745	BPSK, Data Rate: MCS0 (6.5)	-2.199	Pass	0.861	Pass
5785	BPSK, Data Rate: MCS0 (6.5)	-1.991	Pass	1.069	Pass
5825	BPSK, Data Rate: MCS0 (6.5)	-3.500	Pass	-0.440	Pass

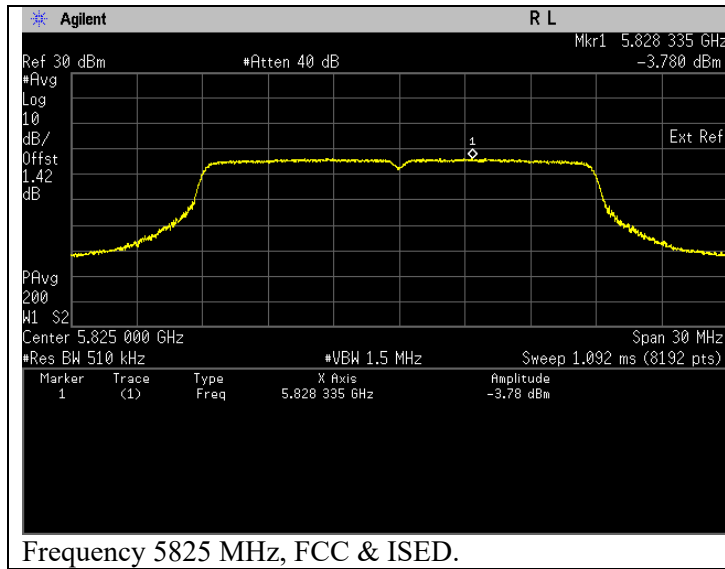
Plots for 802.11n (HT20) (26dB EBW & 99% EBW)



Frequency 5745 MHz, FCC & ISSED.



Frequency 5785 MHz, FCC & ISSED.



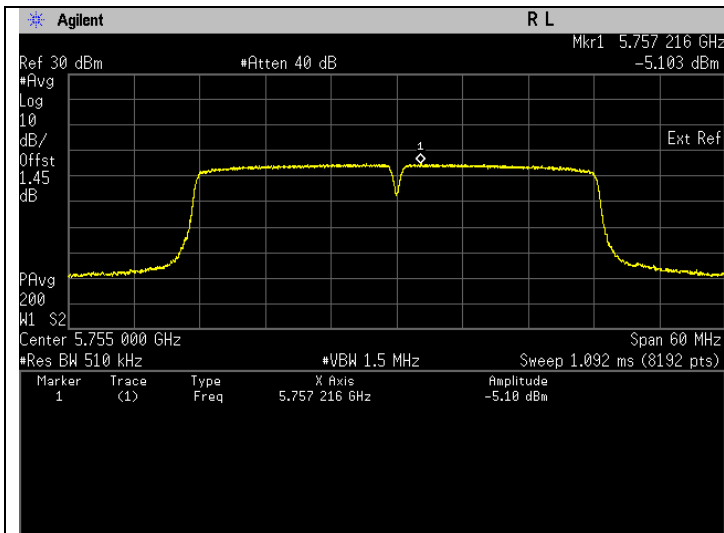
802.11n (HT40) (26dB EBW)

Freq. (MHz)	Test Conditions	Power/Frequency (dBm/500kHz)	Status
5755	BPSK, Data Rate: MCS0 (13.5)	-4.547	Pass
5795	BPSK, Data Rate: MCS0 (13.5)	-4.984	Pass

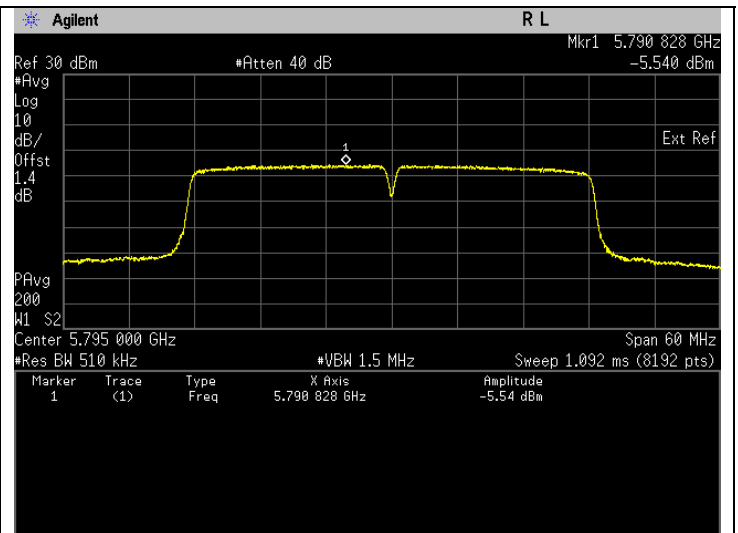
802.11n (HT40)(99% EBW)

Freq. (MHz)	Test Conditions	Power/Frequency (dBm/500kHz)	Status	EIRP (dBm/MHz)	Status
5755	BPSK, Data Rate: MCS0 (13.5)	-4.547	Pass	-1.487	Pass
5795	BPSK, Data Rate: MCS0 (13.5)	-4.984	Pass	-1.924	Pass

Plots for 802.11n (HT40) (26dB EBW & 99% EBW)



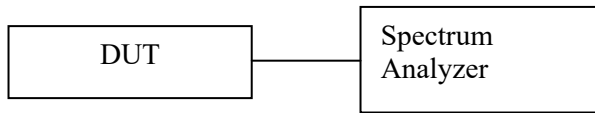
Frequency 5755 MHz, FCC & ISSED.



Frequency 5795 MHz, FCC & ISSED.

6.4. 6dB Bandwidth

6.4.1. Test Setup



- a) Test setup as per illustrated above.
- b) Set DUT to transmit at desire transmit frequency.
- c) 6dB bandwidth is applicable for the band 5.725-5.85GHz only.
- d) Connect DUT's antenna terminal to spectrum analyzer with a low loss cable.
- e) Setting of Spectrum analyzer :
 - RBW = 100 kHz
 - VBW $\geq 3 \cdot$ RBW
 - Detector = Peak
 - Trace = Max Hold
 - Sweep = Auto couple
- f) Allow trace to stabilize.
- g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.
- h) The measurement method follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r04 under clause C.2).

6.4.2. Test Limits

FCC 15.407(e)

Within the 5.725-5.85GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

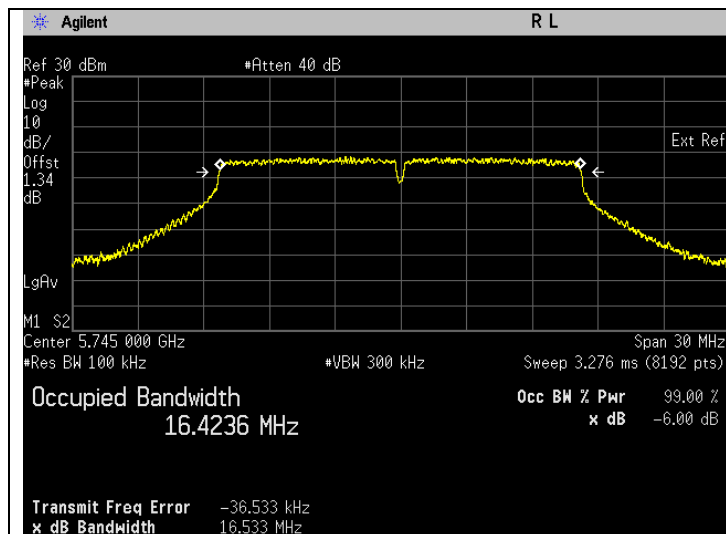
RSS 247 6.2.4

For equipment operating in the band 5725-5850 MHz, the minimum 6 dB bandwidth shall be at least 500 kHz.

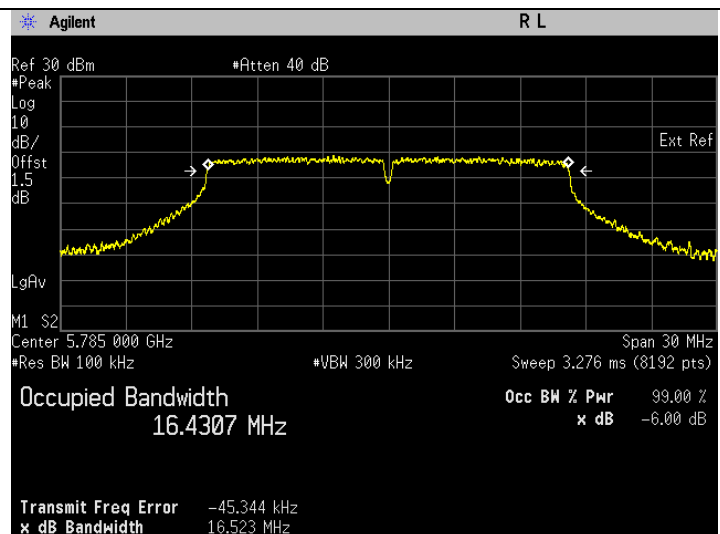
6.4.3. Test Data

802.11a

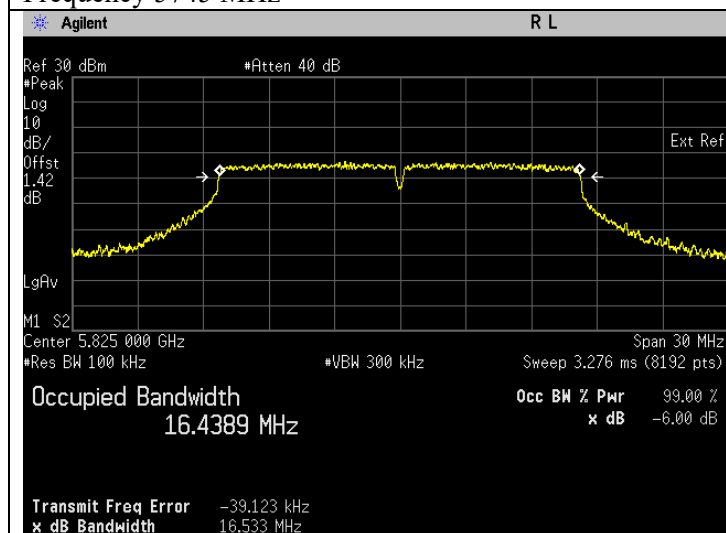
Freq. (MHz)	Test Configuration	Results	
		Bandwidth(MHz)	Status
5745	BPSK, Data Rate: 6	16.533	Pass
5785	BPSK, Data Rate: 6	16.523	Pass
5825	BPSK, Data Rate: 6	16.533	Pass



Frequency 5745 MHz



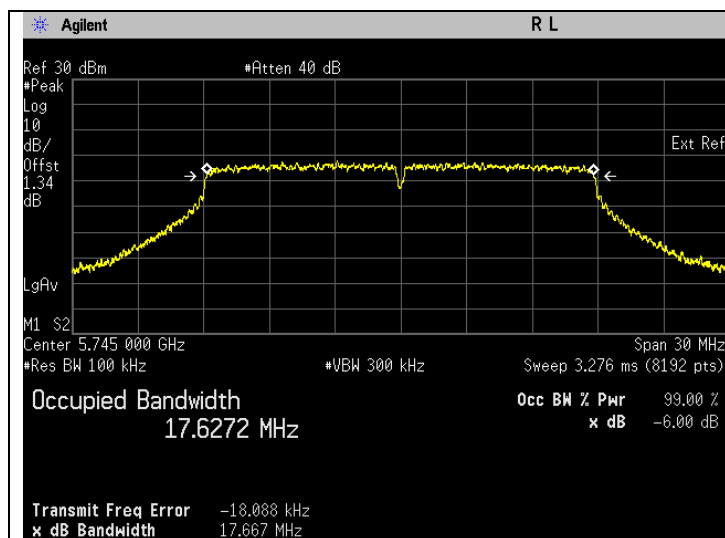
Frequency 5785 MHz



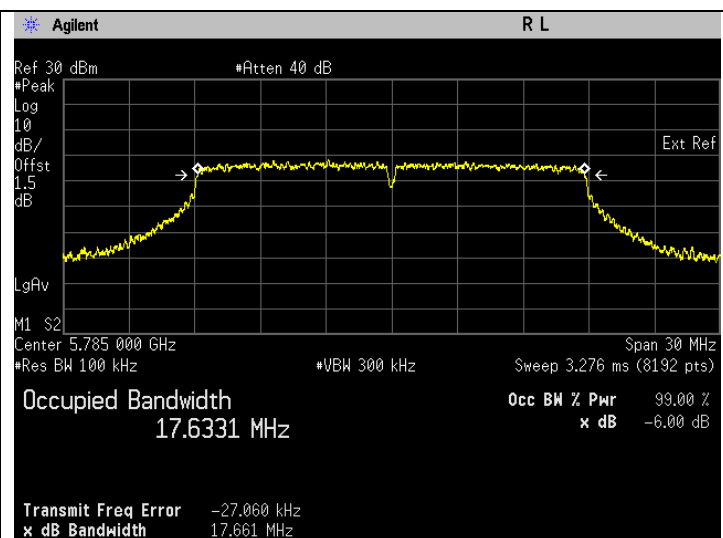
Frequency 5825 MHz

802.11n (HT20)

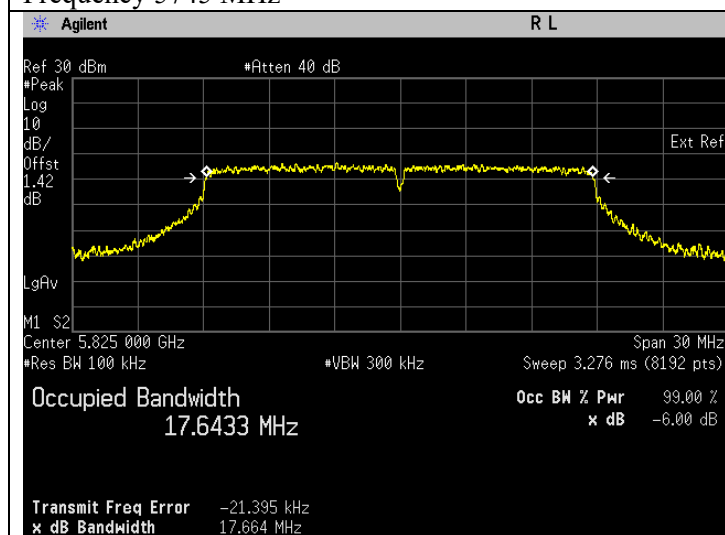
Freq. (MHz)	Test Configuration	Results	
		Bandwidth(MHz)	Status
5745	BPSK, Data Rate: MCS0 (6.5)	17.668	Pass
5785	BPSK, Data Rate: MCS0 (6.5)	17.661	Pass
5825	BPSK, Data Rate: MCS0 (6.5)	17.664	Pass



Frequency 5745 MHz



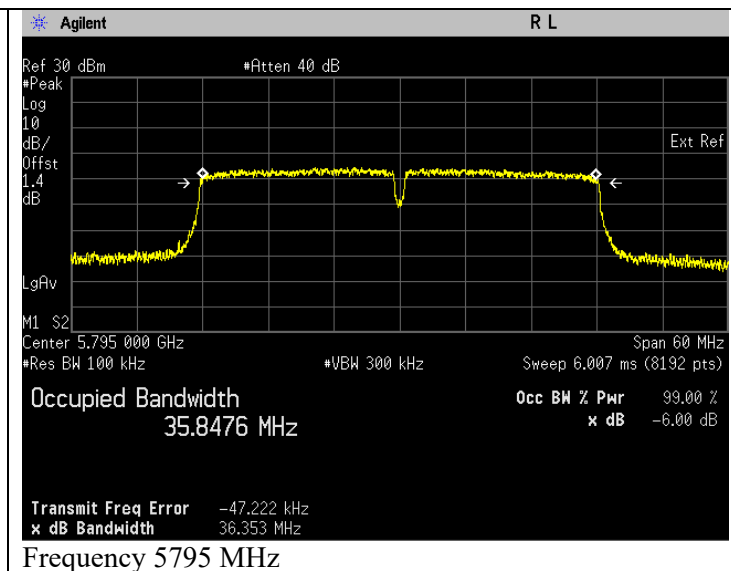
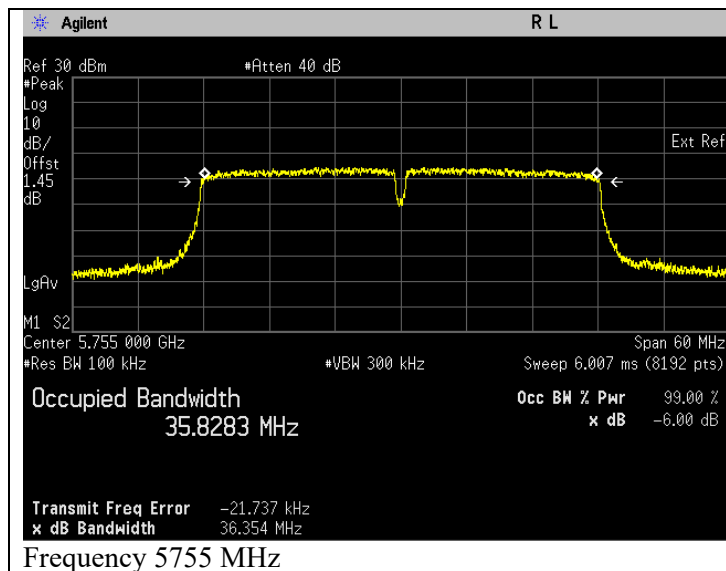
Frequency 5785 MHz



Frequency 5825 MHz

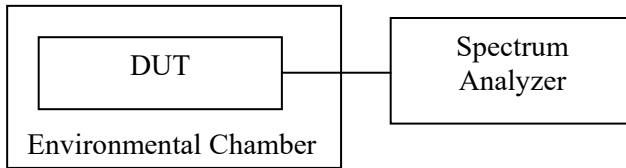
802.11n (HT40)

Freq. (MHz)	Test Configuration	Results	
		Bandwidth(MHz)	Status
5755	BPSK, Data Rate: MCS0 (13.5)	36.354	Pass
5795	BPSK, Data Rate: MCS0 (13.5)	36.353	Pass



6.5. Frequency Stability

6.5.1. Test Setup



- Test setup as per illustrated above.
- Set DUT to transmit un-modulated signal at desire transmit frequency.
- Connect DUT's antenna terminal to spectrum analyzer with a low loss cable.
- The DUT was operated at the maximum output power, and spectrum which is set to maximum hold function and peak detector.
- The peak value of the power envelope was measured and noted.
- Test was conducted from temperature range from -30⁰C to 50⁰C with step size of 10⁰C on manufacturer's rated supply voltage.
- At temperature of 20⁰C, +/-15% of manufacturer's rated voltage are to be applied.
- The frequency stability is measured and recorded of frequency deviation due to temperature and supply voltage variations as mentioned at condition f) & g) above.

6.5.2. Test Limits

FCC 15.407(g)

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual.

RSS-GEN 6.11

6.5.3. Test Data

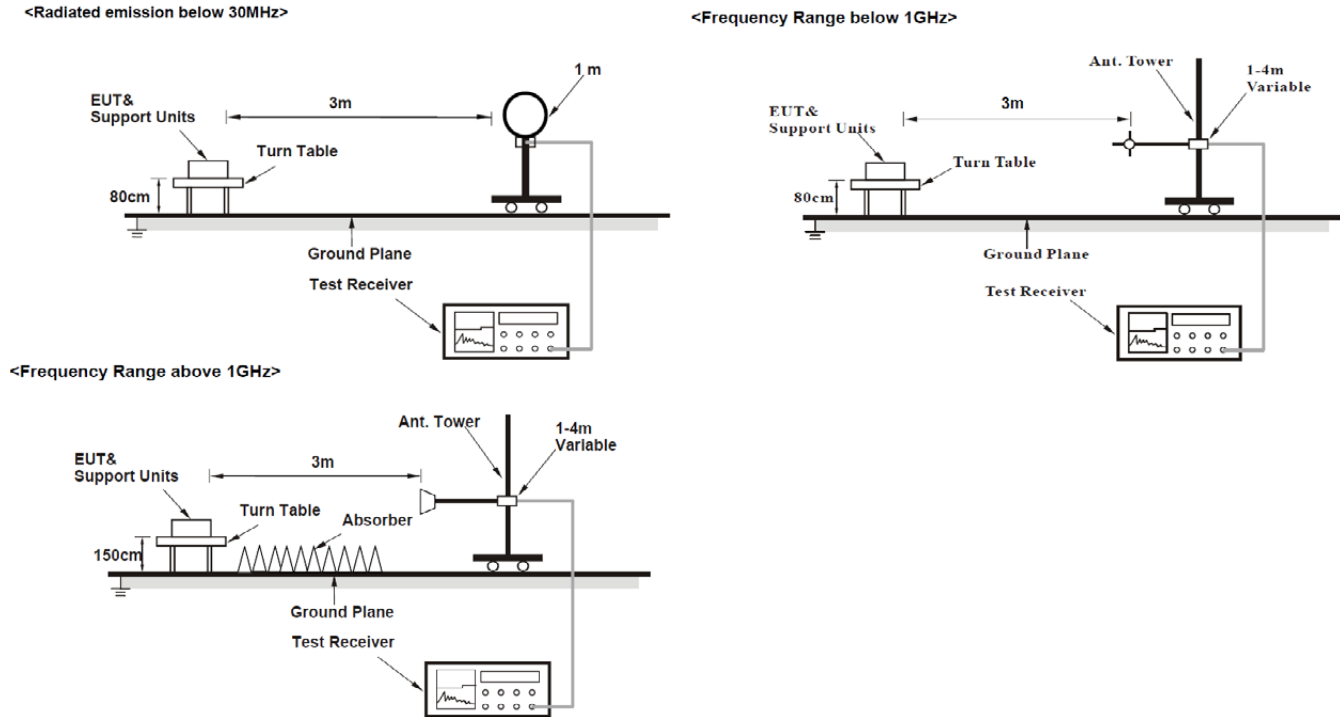
802.11a

Test Configuration	Test Frequency
	Tx (MHz)
BPSK, Data Rate: 6	5745

Temperature(°C)	Voltage	Results			
		Measured Frequency(MHz)	Frequency Error(kHz)	Frequency Error(%)	Status
20	+15%	5744.988530	11.470000	0.000200	Pass
	±0%	5744.984887	15.113000	0.000263	Pass
	-8.11%	5744.979024	20.976000	0.000365	Pass
-30		5744.976817	23.183000	0.000404	Pass
-20		5744.980764	19.236000	0.000335	Pass
-10		5745.013851	13.851000	0.000241	Pass
0		5745.053204	53.204000	0.000926	Pass
10		5744.977084	22.961000	0.000400	Pass
30		5745.004543	4.543000	0.000079	Pass
40		5745.002137	2.137000	0.000037	Pass
50		5744.987830	12.170000	0.000212	Pass

6.6. Band Edge Radiated Spurious Emission Measurement

6.6.1. Test Setup



1. The EUT is placed on the top of a rotating table 0.8m/1.5m above the ground at a 3m semi-anechoic chamber. The table is rotated 360 degrees to determine the position of the highest radiation.
2. The EUT is set 3m away from the interference-receiving antenna, which is mounted on the top of a variable-height antenna tower.
3. The antenna is Bilog/Horn antenna depend on which frequency range uses, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT is arranged to its worst case and then the antenna is tuned to heights from 1m to 4m and the rotatable table is turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system is set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode is fall within the range of 10dB from the limit specified, the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. Otherwise, the testing could be stopped and the peak values of the EUT would be reported.

NOTE:

- The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection at frequency below 1GHz.
- The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3 MHz for Peak detection at frequency above 1 GHz.
- The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz for Average detection using reduced video bandwidth (Duty cycle $\geq 98\%$) at frequency above 1GHz.
- The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $1/\tau$ Hz, where τ is minimum transmitter on time (Duty cycle $< 98\%$) for Average detection using reduced video bandwidth at frequency above 1GHz.
- All modes of operation were investigated and the worst-case emissions are reported.

6.6.2. Test Limits

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

Frequency (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:

- The lower limit shall apply at the transition frequencies.
- Emission level (dBuV/m) = 20 log Emission level (uV/m).
- For frequencies above 1000 MHz, 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.

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

Applicable To		Limit	
789033 D02 General UNII Test Procedures New Rules v01r03		Field Strength at 3 m	
		PK: 74 (dBuV/m)	AV: 54 (dBuV/m)
Frequency Band	Applicable To	EIRP Limit	Equivalent Field Strength at 3 m
5150~5250 MHz	15.407(b)(1)	PK: -27 (dBm/MHz)	PK: 68.2 (dBuV/m)
5250~5350 MHz	15.407(b)(2)		
5470~5725 MHz	15.407(b)(3)		
5725~5850 MHz	15.407(b)(4)(i)	PK:-27 (dBm/MHz) ^{*1} PK:10 (dBm/MHz) ^{*2} PK:15.6 (dBm/MHz) ^{*3} PK:27 (dBm/MHz) ^{*4}	PK: 68.2 (dBuV/m) ^{*1} PK:105.2 (dBuV/m) ^{*2} PK: 110.8 (dBuV/m) ^{*3} PK:122.2 (dBuV/m) ^{*4}
	15.407(b)(4)(ii)	Emission limits in section 15.247(d)	

^{*1} beyond 75 MHz or more above of the band edge.
^{*2} below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.
^{*3} below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.
^{*4} from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

NOTE:

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

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

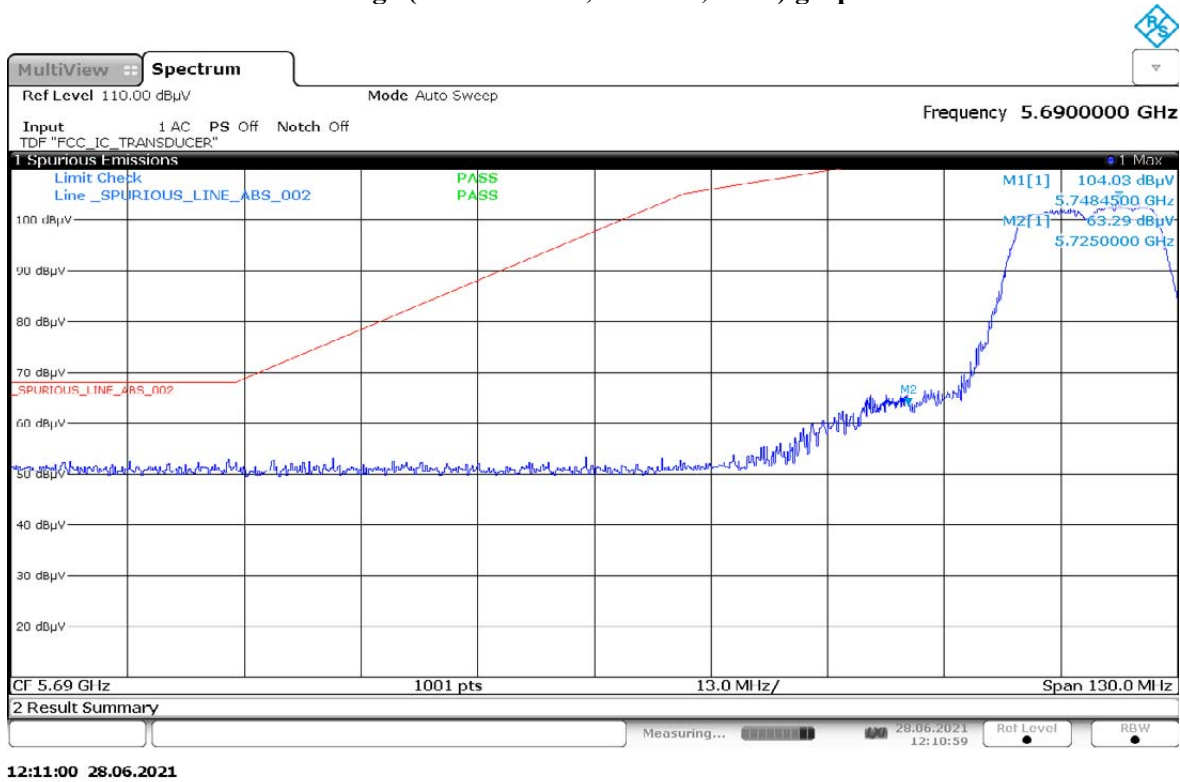
802.11a

Restricted Band Edge (Low Channel) tabular data

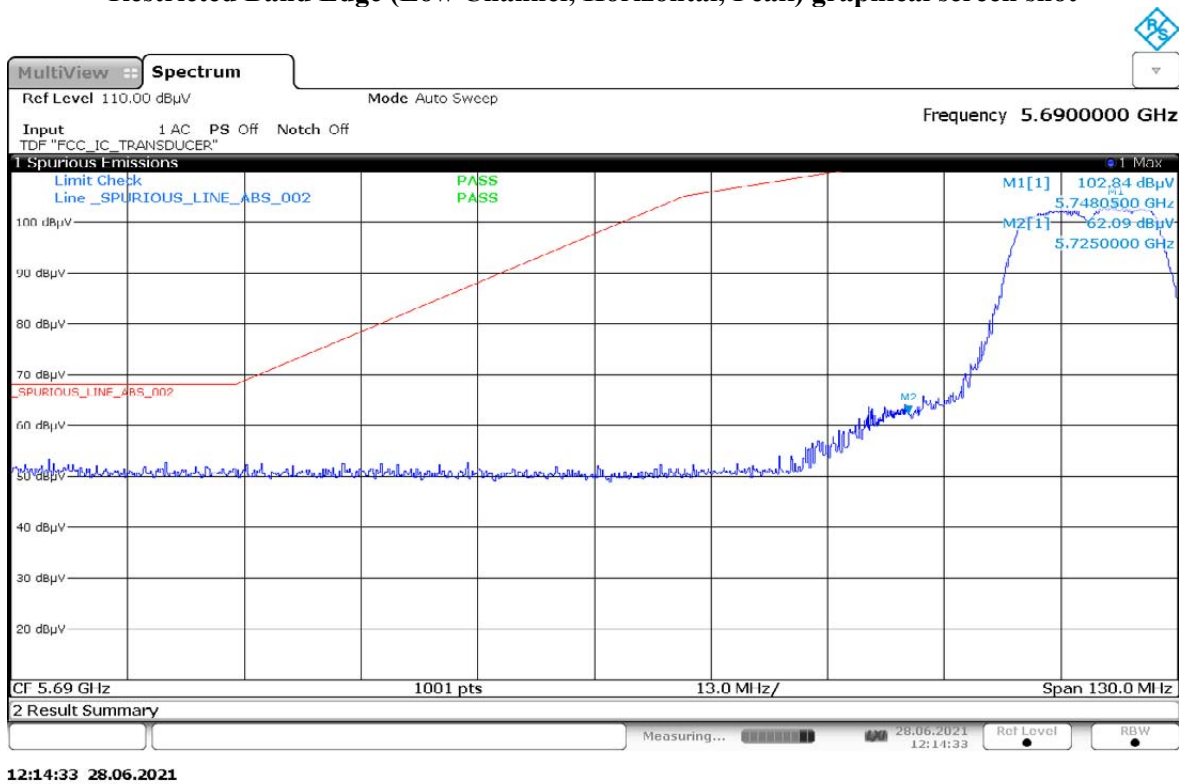
Remarks: Pass Result	Marginal Result	Fail Result
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Humidity (%): 69.5
Test Date: Mon, 28 Jun, 2021

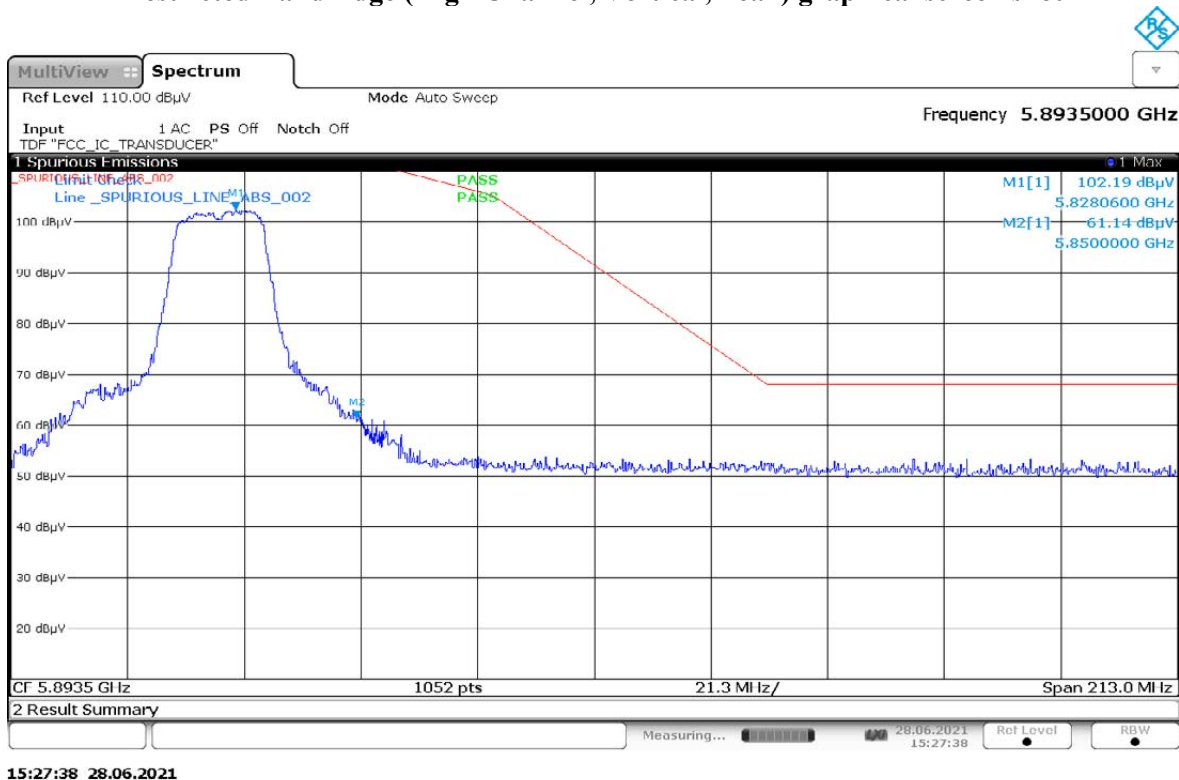
Restricted Band Edge (Low Channel, Vertical, Peak) graphical screen shot



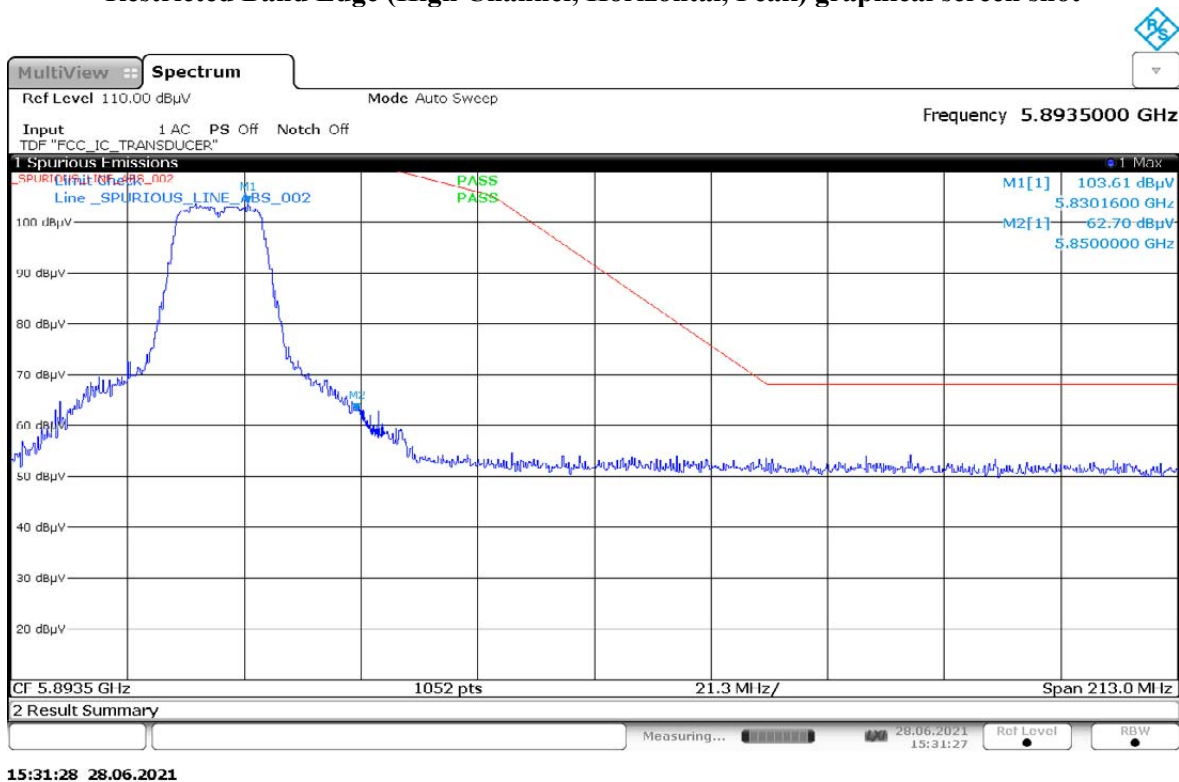
Restricted Band Edge (Low Channel, Horizontal, Peak) graphical screen shot



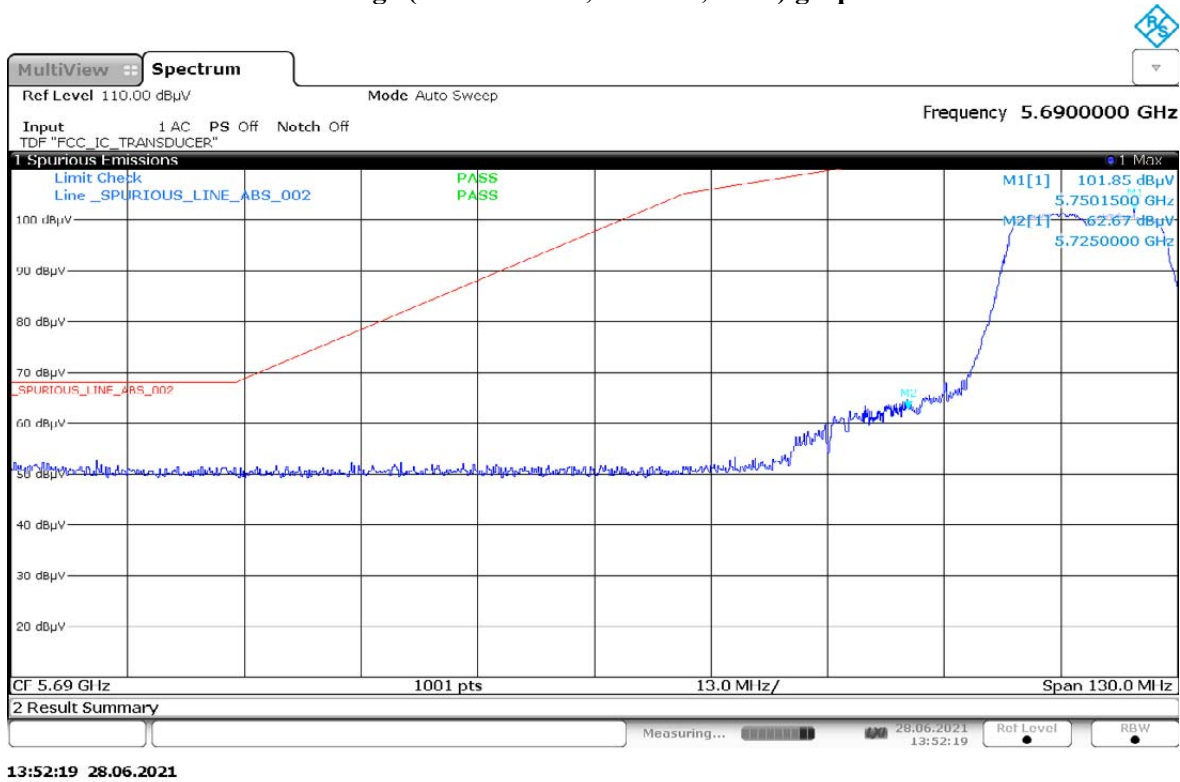
Restricted Band Edge (High Channel, Vertical, Peak) graphical screen shot



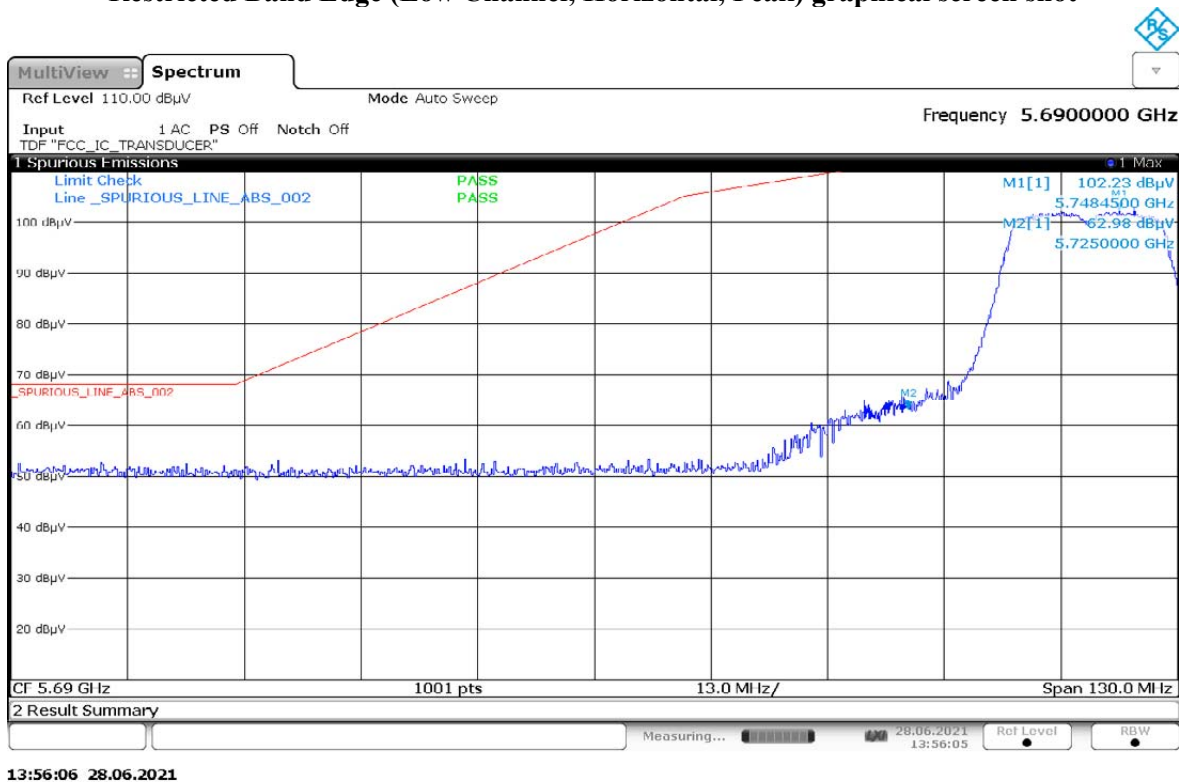
Restricted Band Edge (High Channel, Horizontal, Peak) graphical screen shot



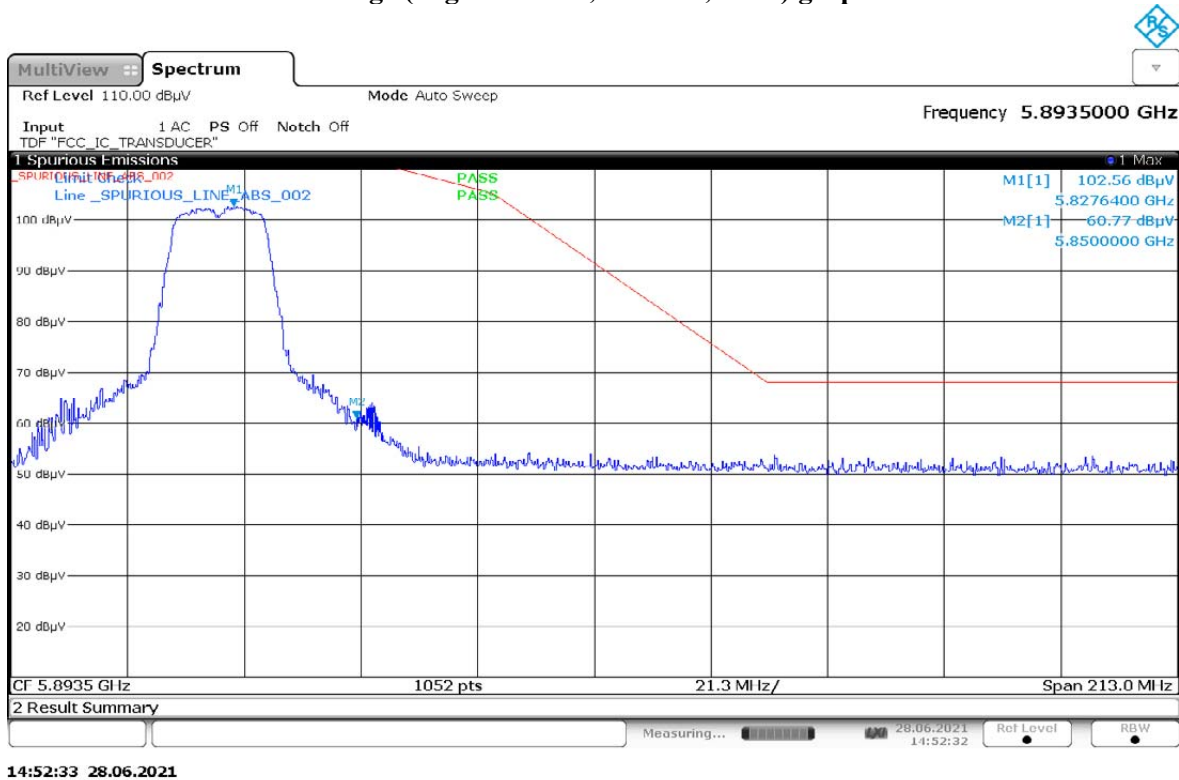
Restricted Band Edge (Low Channel, Vertical, Peak) graphical screen shot



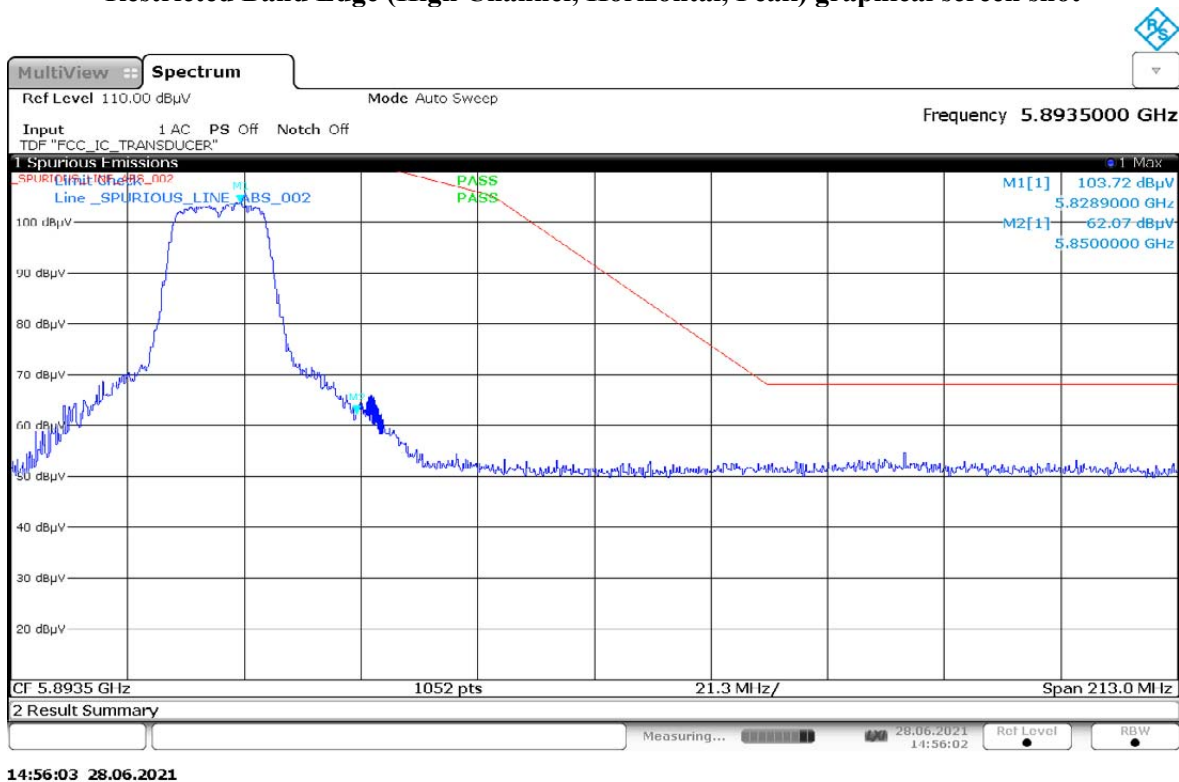
Restricted Band Edge (Low Channel, Horizontal, Peak) graphical screen shot



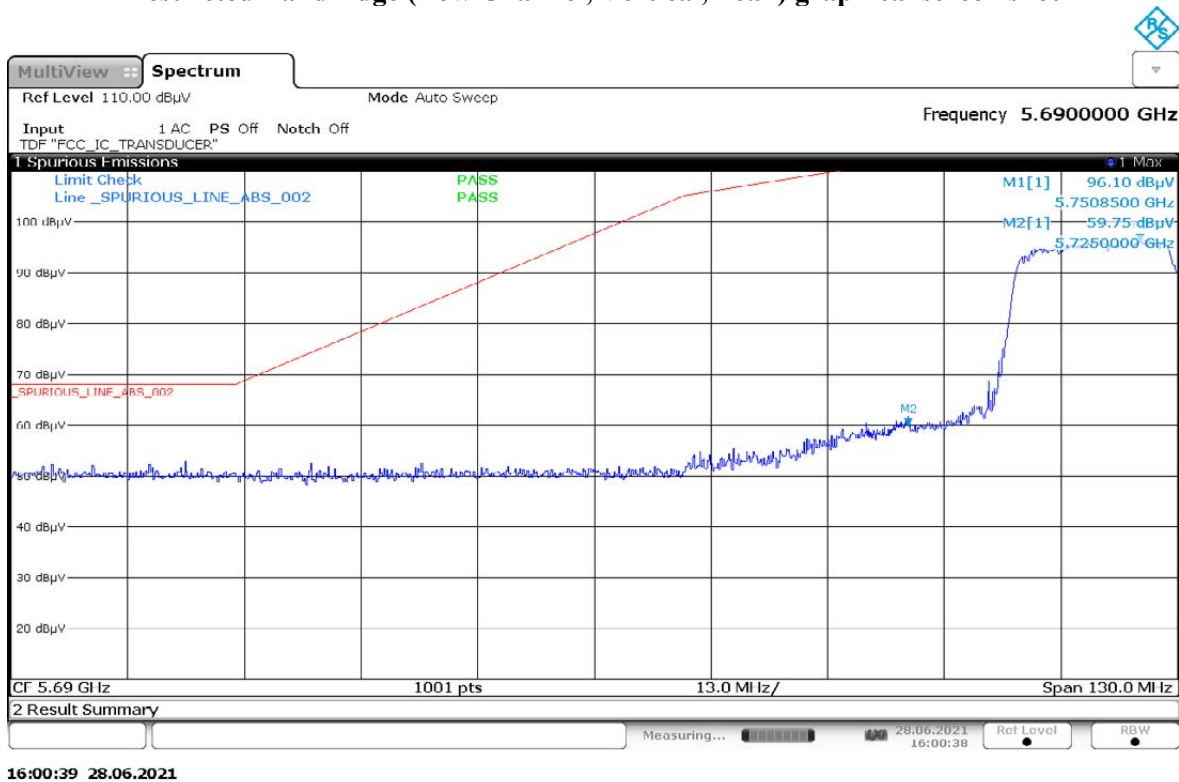
Restricted Band Edge (High Channel, Vertical, Peak) graphical screen shot



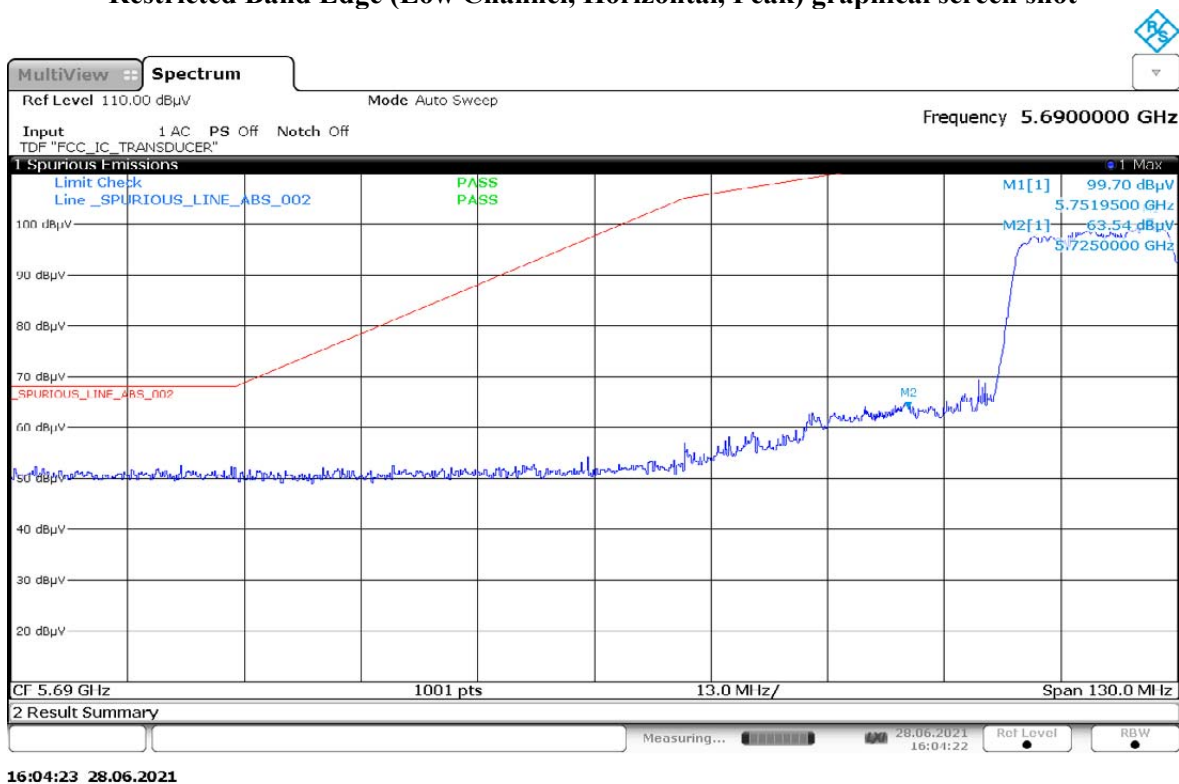
Restricted Band Edge (High Channel, Horizontal, Peak) graphical screen shot



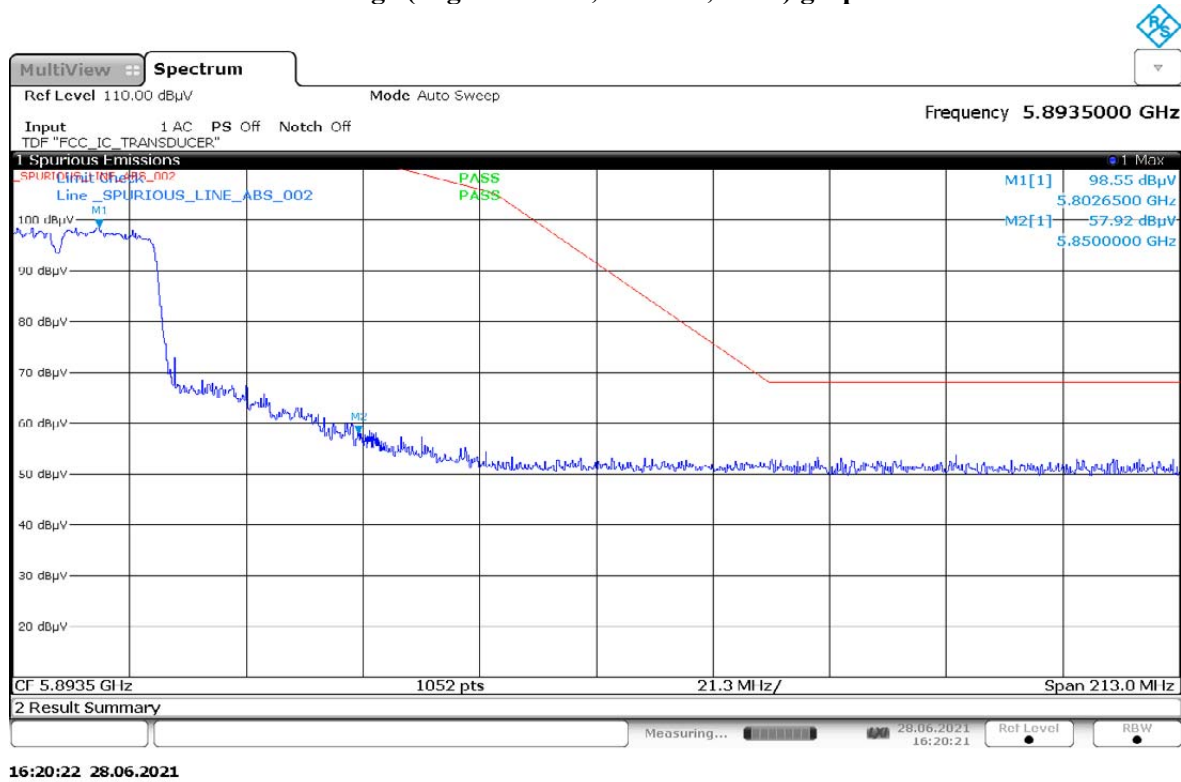
Restricted Band Edge (Low Channel, Vertical, Peak) graphical screen shot



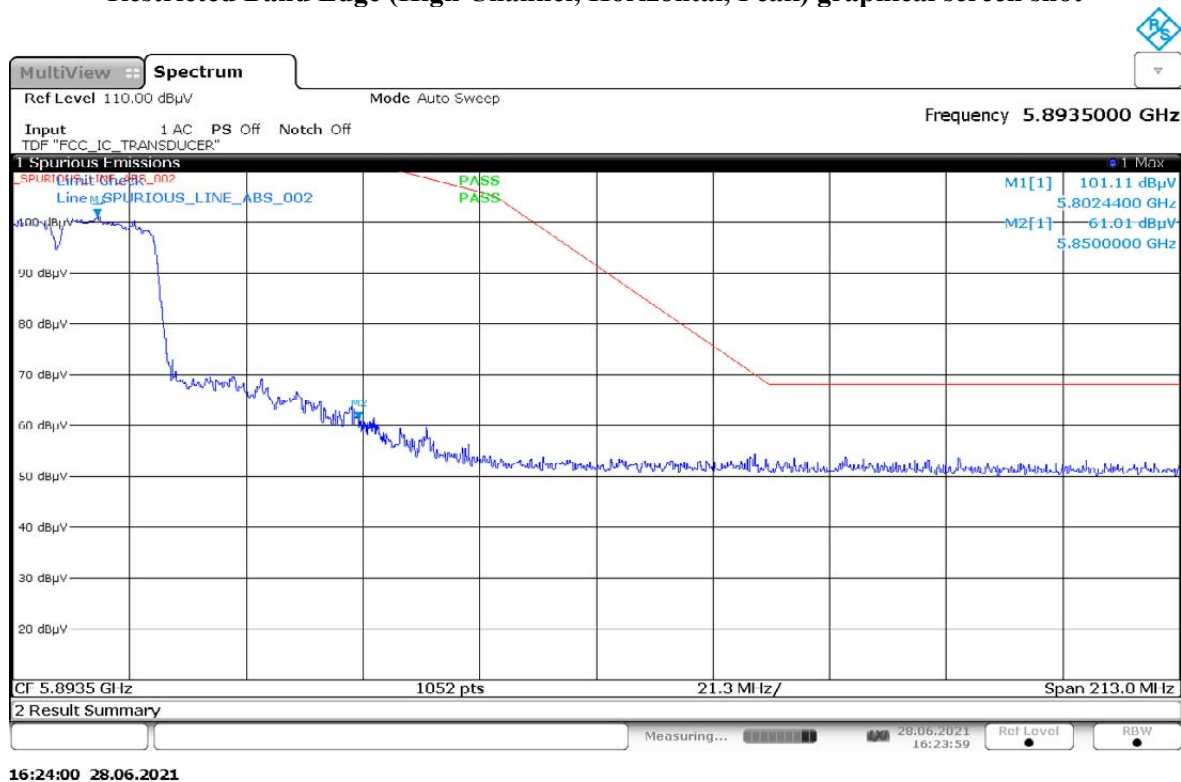
Restricted Band Edge (Low Channel, Horizontal, Peak) graphical screen shot



Restricted Band Edge (High Channel, Vertical, Peak) graphical screen shot



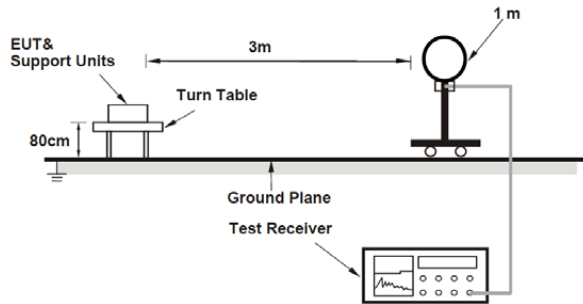
Restricted Band Edge (High Channel, Horizontal, Peak) graphical screen shot



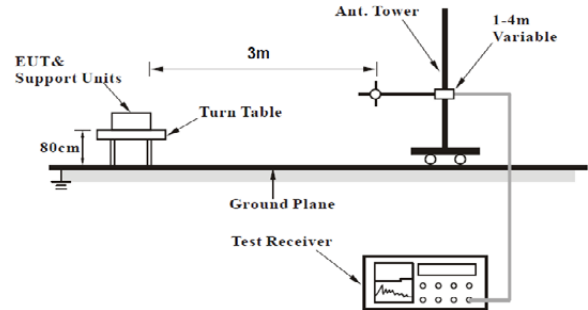
6.7. Radiated Spurious Emission Measurement

6.7.1. Test Setup

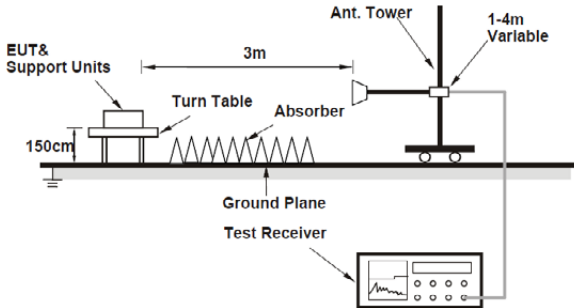
<Radiated emission below 30MHz>



<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



1. The EUT is placed on the top of a rotating table 0.8m/1.5m above the ground at a 3m semi-anechoic chamber. The table is rotated 360 degrees to determine the position of the highest radiation.
2. The EUT is set 3m away from the interference-receiving antenna, which is mounted on the top of a variable-height antenna tower.
3. The antenna is Bilog/Horn antenna depend on which frequency range uses, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT is arranged to its worst case and then the antenna is tuned to heights from 1m to 4m and the rotatable table is turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system is set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode is fall within the range of 10dB from the limit specified, the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. Otherwise, the testing could be stopped and the peak values of the EUT would be reported.

NOTE:

- The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection at frequency below 1GHz.
- The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3 MHz for Peak detection at frequency above 1 GHz.
- The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz for Average detection using reduced video bandwidth (Duty cycle $\geq 98\%$) at frequency above 1GHz.
- The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $1/\tau$ Hz, where τ is minimum transmitter on time (Duty cycle $< 98\%$) for Average detection using reduced video bandwidth at frequency above 1GHz.
- All modes of operation were investigated and the worst-case emissions are reported.

6.7.2. Test Limits

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

Frequency (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:

- The lower limit shall apply at the transition frequencies.
- Emission level (dBuV/m) = 20 log Emission level (uV/m).
- For frequencies above 1000 MHz, 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.

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

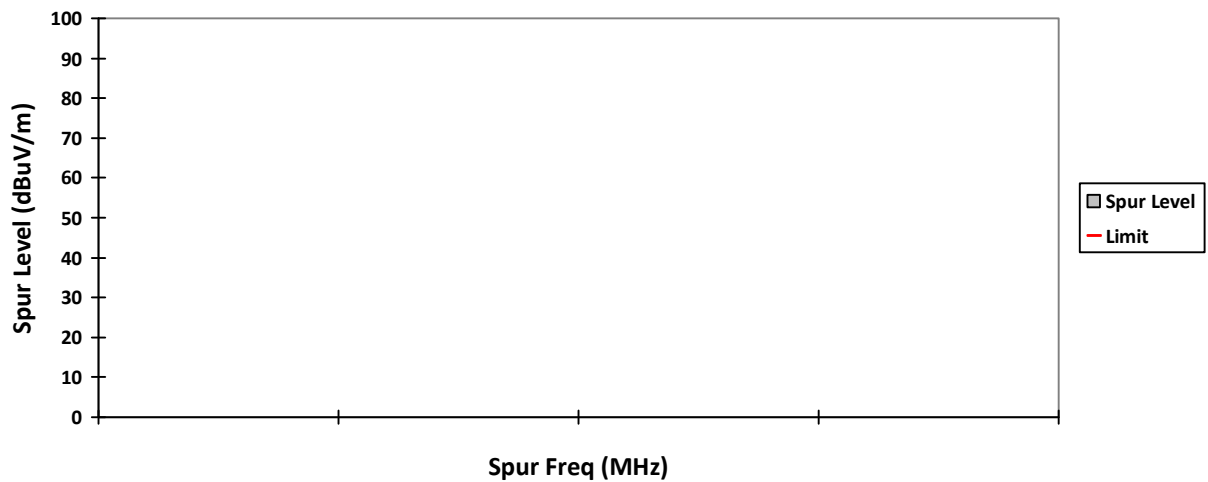
Applicable To		Limit	
789033 D02 General UNII Test Procedures New Rules v01r03		Field Strength at 3 m	
		PK: 74 (dBµV/m)	AV: 54 (dBµV/m)
Frequency Band	Applicable To	EIRP Limit	Equivalent Field Strength at 3 m
5150–5250 MHz	15.407(b)(1)	PK: -27 (dBm/MHz)	PK: 68.2 (dBµV/m)
5250–5350 MHz	15.407(b)(2)		
5470–5725 MHz	15.407(b)(3)		
5725–5850 MHz	15.407(b)(4)(i)	PK: -27 (dBm/MHz) ^{*1} PK: 10 (dBm/MHz) ^{*2} PK: 15.6 (dBm/MHz) ^{*3} PK: 27 (dBm/MHz) ^{*4}	PK: 68.2 (dBµV/m) ^{*1} PK: 105.2 (dBµV/m) ^{*2} PK: 110.8 (dBµV/m) ^{*3} PK: 122.2 (dBµV/m) ^{*4}
	15.407(b)(4)(ii)	Emission limits in section 15.247(d)	
^{*1} beyond 75 MHz or more above of the band edge.			
^{*2} below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.			
^{*3} below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.			
^{*4} from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.			

NOTE:

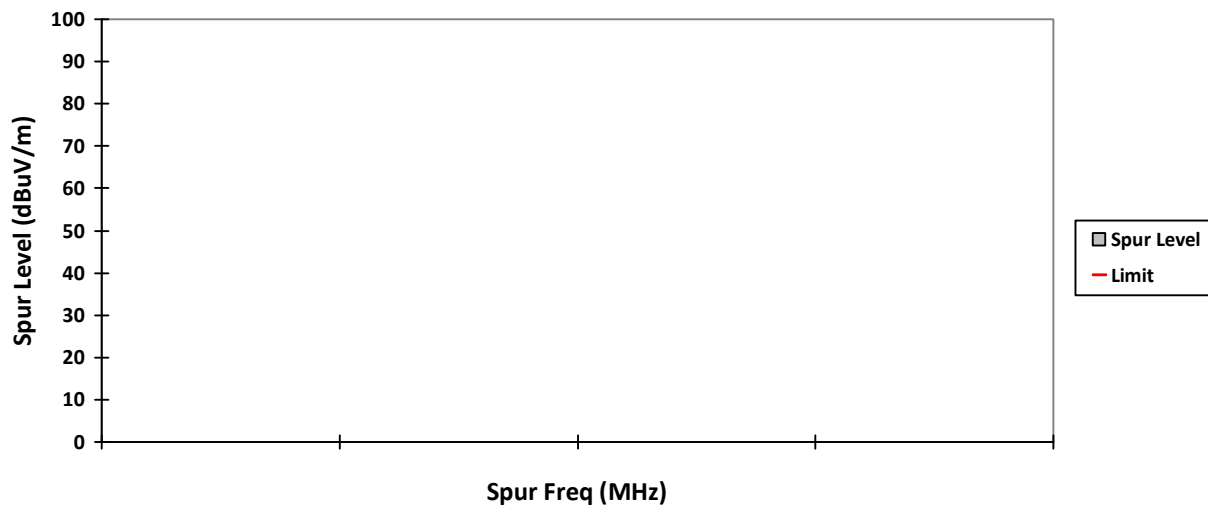
The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

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

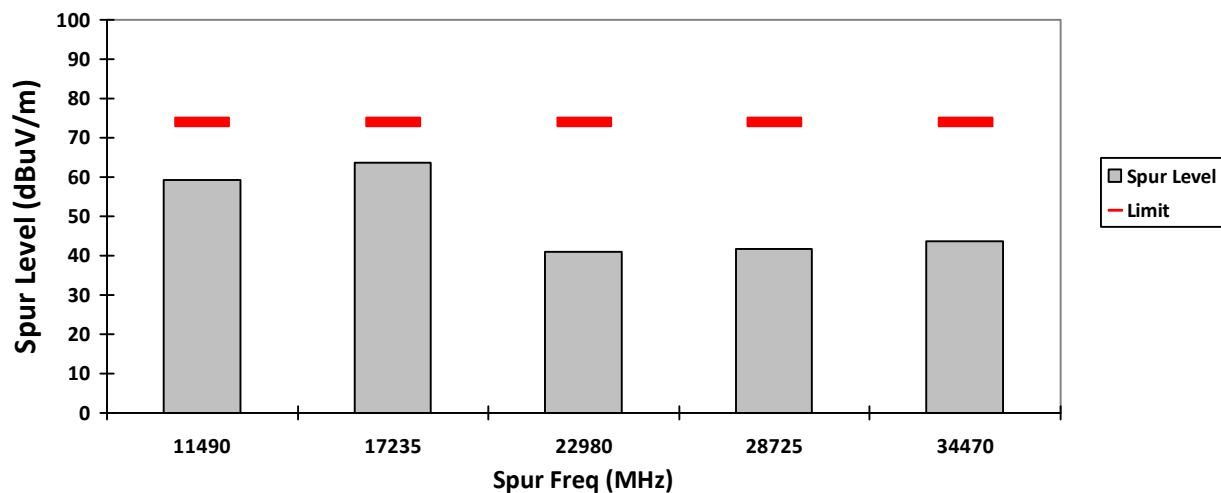
VERTICAL, QPK



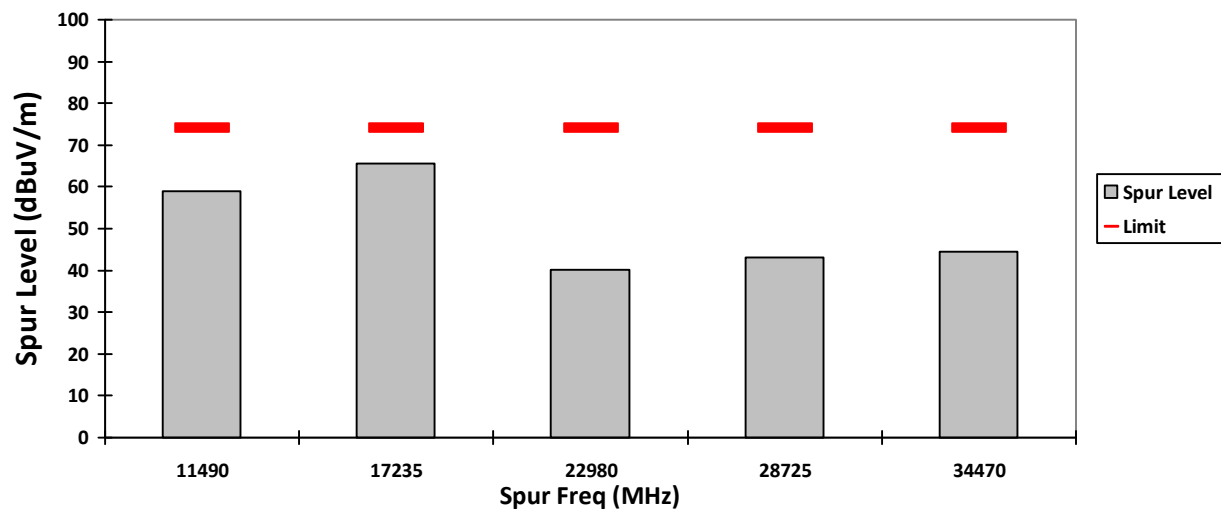
HORIZONTAL, QPK



VERTICAL, PK



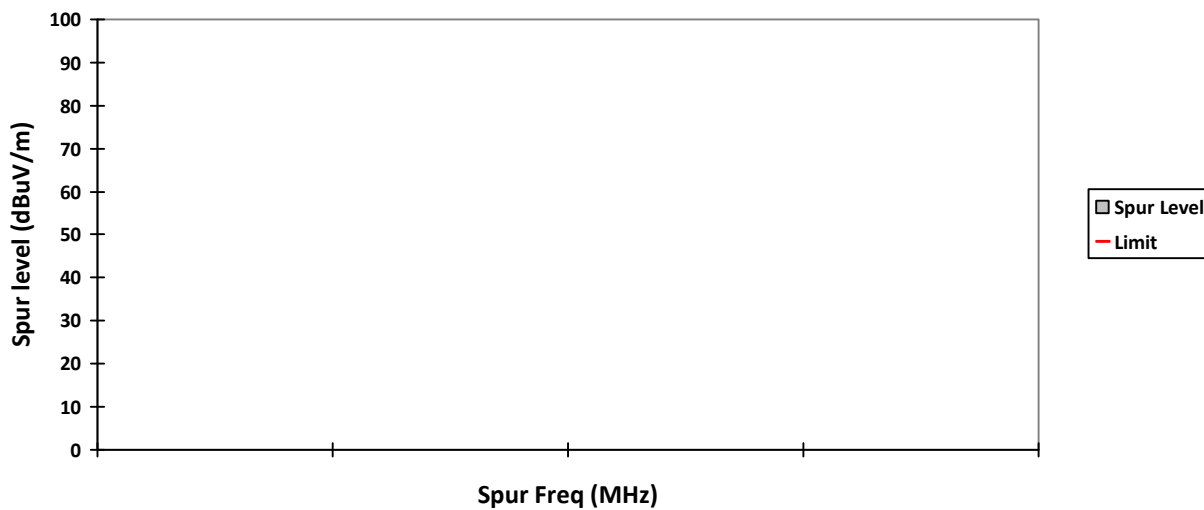
HORIZONTAL, PK



VERTICAL, AV



HORIZONTAL, AV



Test: WIFI SAC Transmitter Radiated Emission
Model#: DLR110NBHLAA S/N: 55017XJ0059 EMC SR ID#: 27179-EMC-00036
Battery: PMNN4578A Accessory: NA
Test Channel: Mid Test Frequency: 5785.0000 MHz Test Standard: ANSI C63.10-2013
Worst Case Plane: X-Plane (802.11a_20MHz)

Radiated Emission (Mid Channel) tabular data

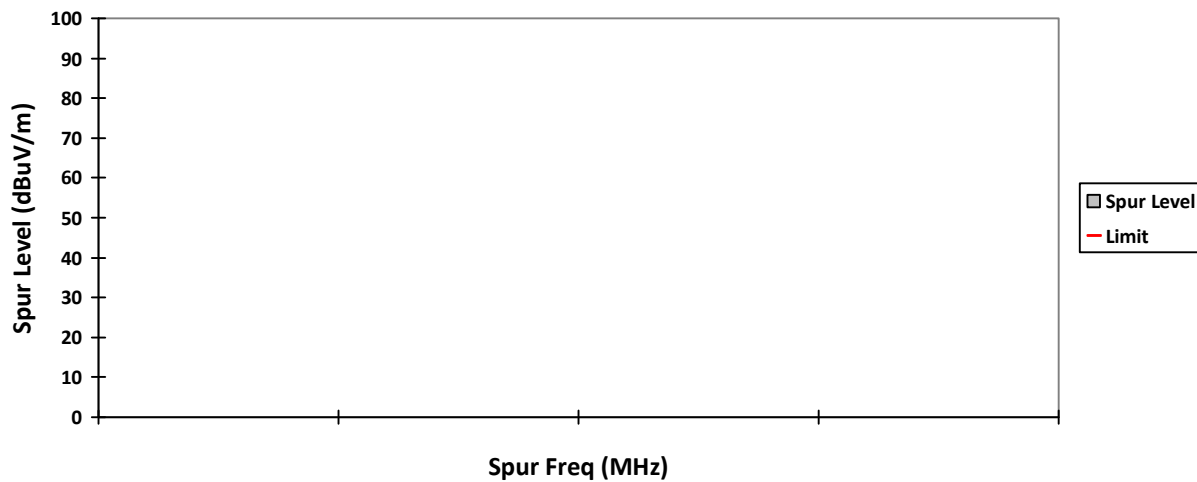
Vertical Radiated Emission Result										
Spur Freq (MHz)	Spur level QPK (dBμV/m)	Spur level PK (dBμV/m)	Spur level AV (dBμV/m)	Limit QPK (dBμV/m)	Limit PK (dBμV/m)	Limit AV (dBμV/m)	Margin QPK (dBμV/m)	Margin PK (dBμV/m)	Margin AV (dBμV/m)	Carrier PK Power (dBμV/m)
11570	-	58.8251**	-	-	74.0	-	-	15.1749**	-	-
17355	-	65.3931**	-	-	74.0	-	-	8.6069**	-	-
23140	-	40.9141**	-	-	74.0	-	-	33.0859**	-	-
28925	-	42.2703**	-	-	74.0	-	-	31.7297**	-	-
34710	-	44.1991**	-	-	74.0	-	-	29.8009**	-	-
Horizontal Radiated Emission Result										
11570	-	59.1276**	-	-	74.0	-	-	14.8724**	-	-
17355	-	64.3099**	-	-	74.0	-	-	9.6901**	-	-
23140	-	40.8297**	-	-	74.0	-	-	33.1703**	-	-
28925	-	42.5255**	-	-	74.0	-	-	31.4745**	-	-
34710	-	45.2065**	-	-	74.0	-	-	28.7935**	-	-

Remarks: Pass Result	Marginal Result	Fail Result
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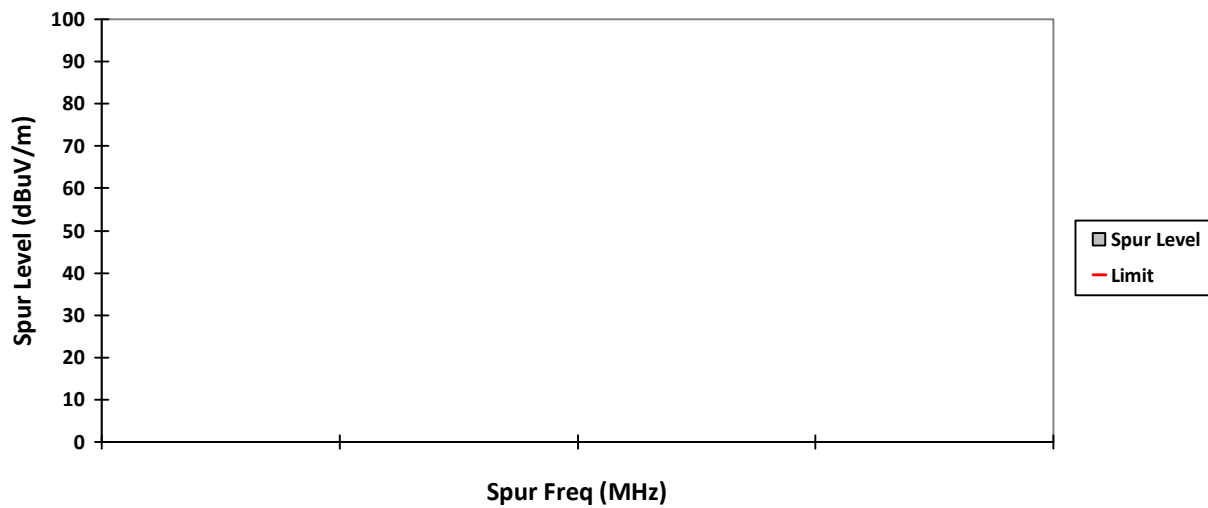
Temperature (degC): 23.3 Humidity (%): 69.5
 Test Performed by: Nazrin&Qawiman Test Date: Tue, 29 Jun, 2021
 System MU: 4.03dB

Remarks: ** Indicates the spurious emission could not be detected due to noise limitations or ambient.
 *Pursuant to CFR 47 Part 2.1057 (c), emissions attenuated more than 20 dB below the permissible limit are not reported.

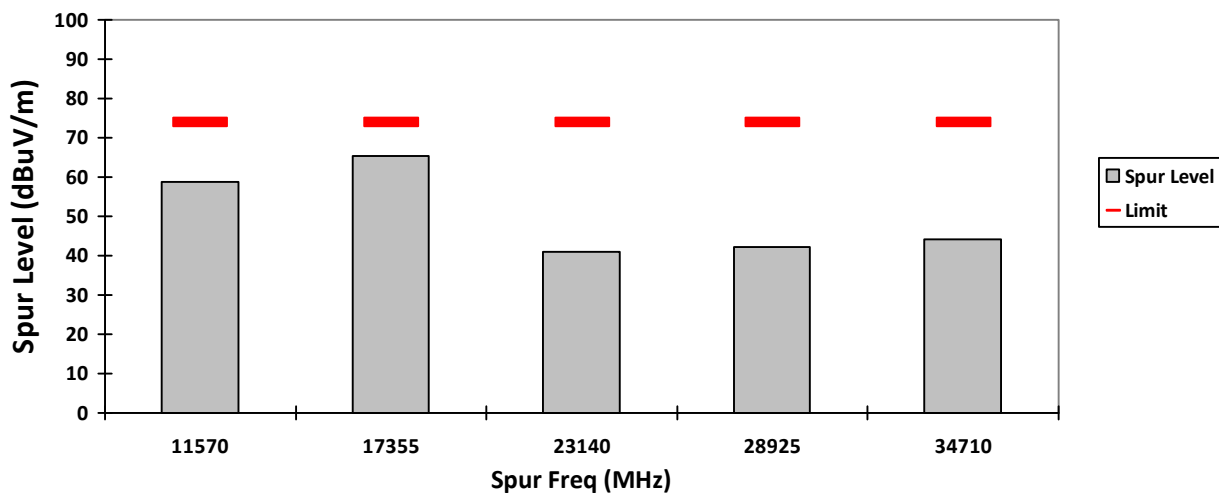
VERTICAL, QPK



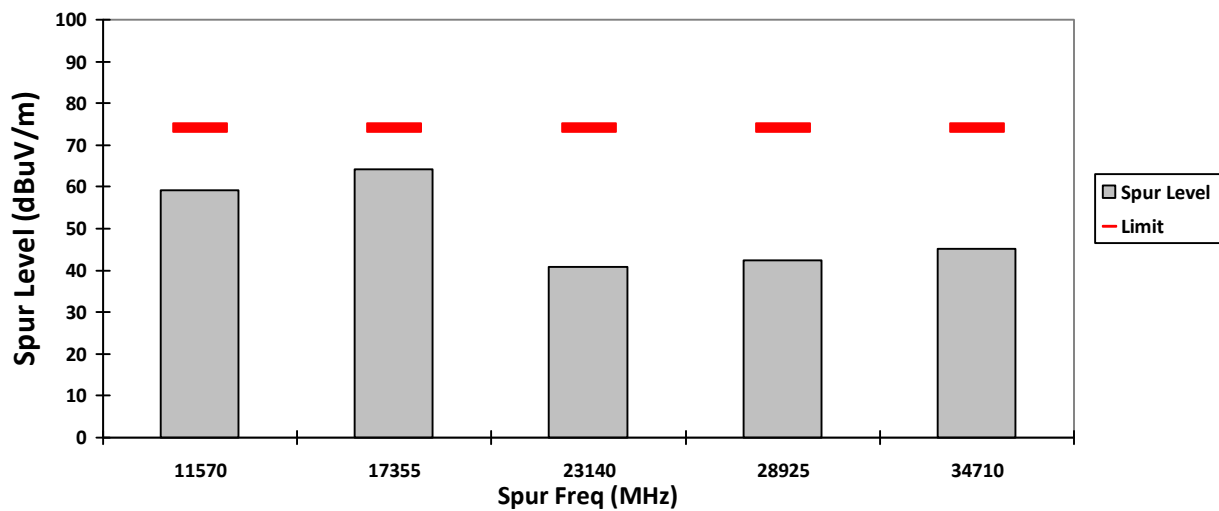
HORIZONTAL, QPK



VERTICAL, PK



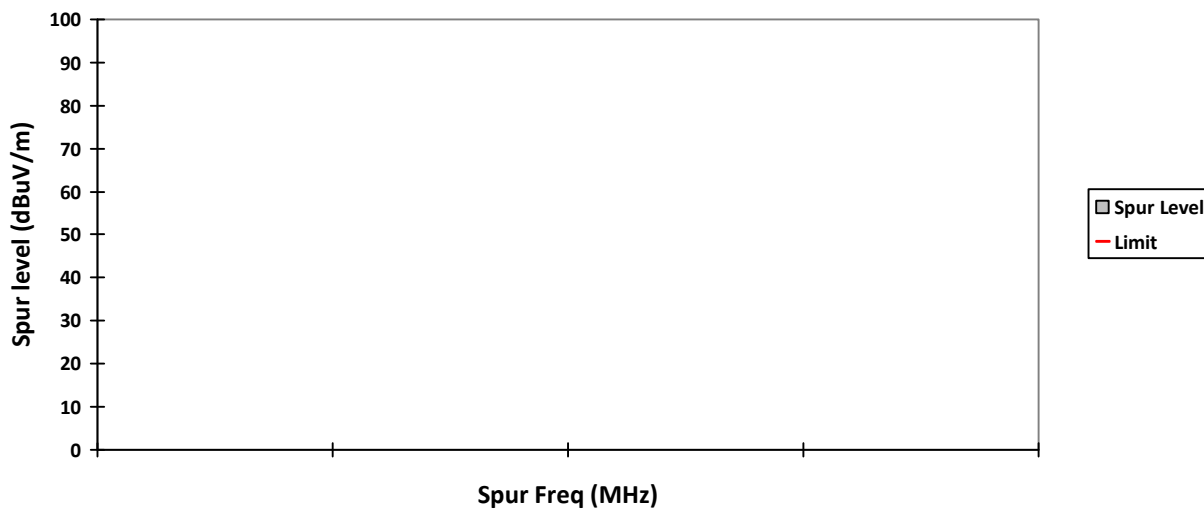
HORIZONTAL, PK



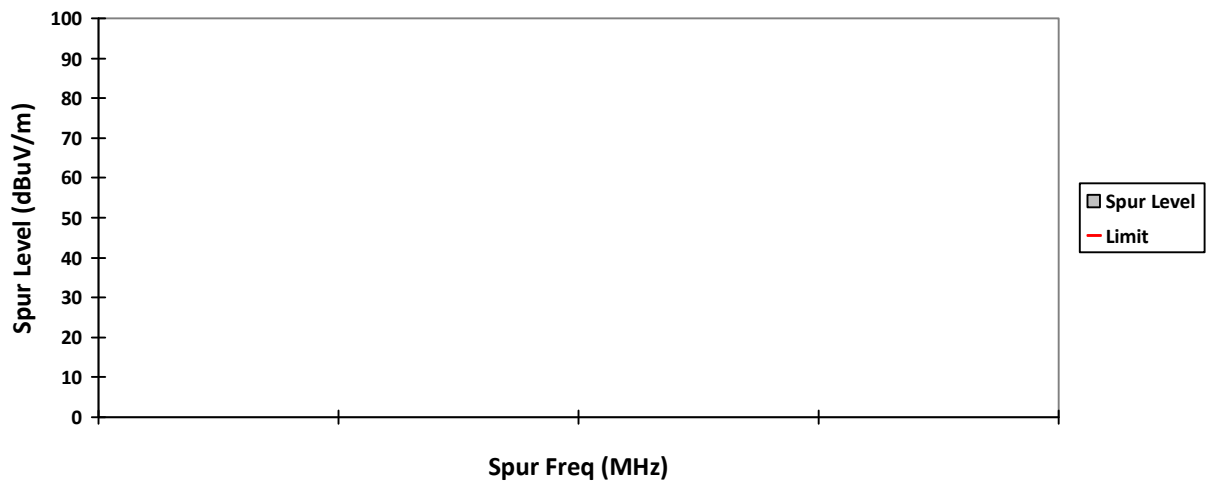
VERTICAL, AV



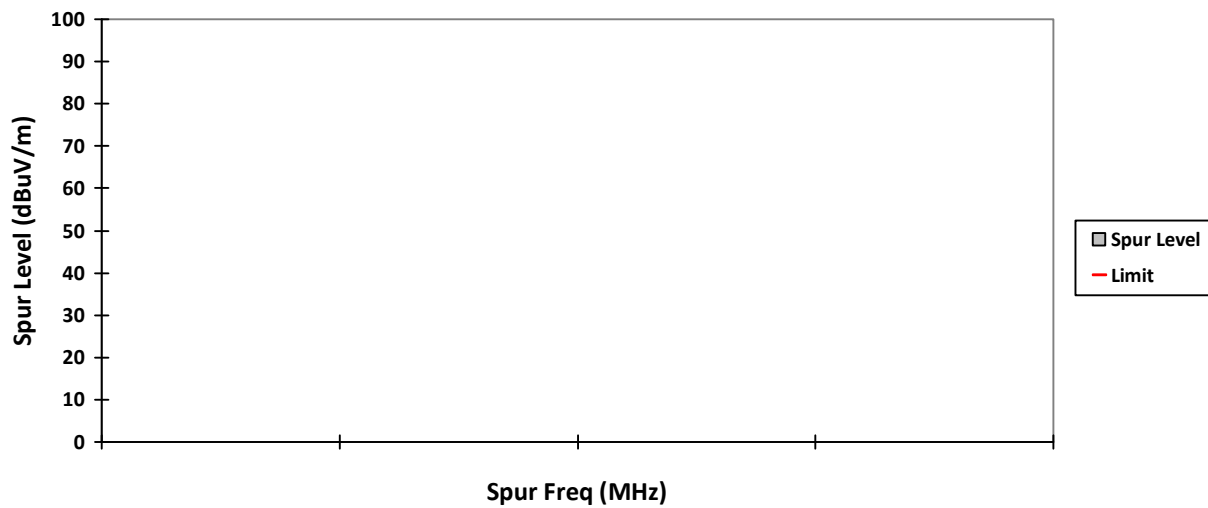
HORIZONTAL, AV



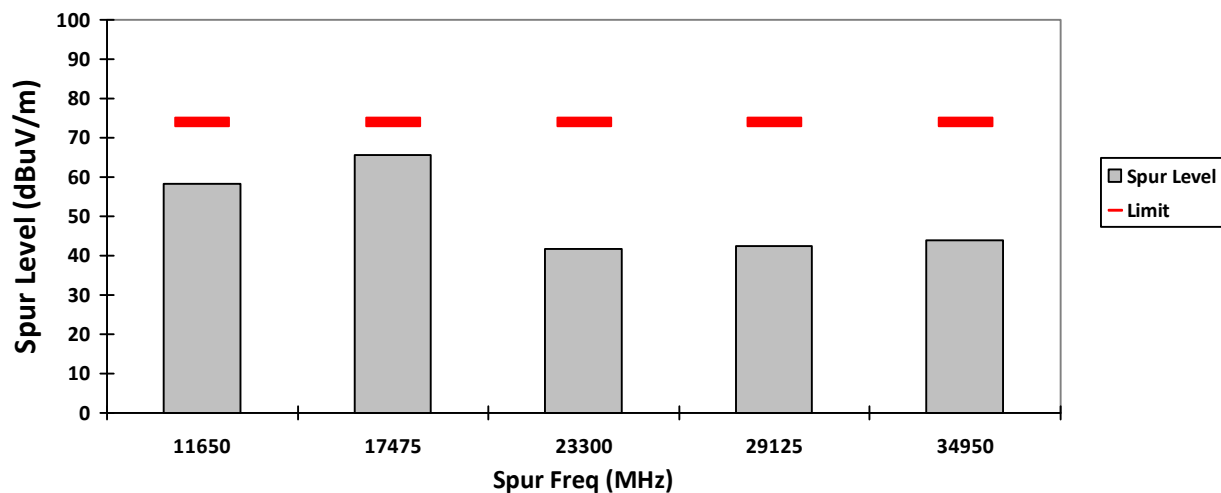
VERTICAL, QPK



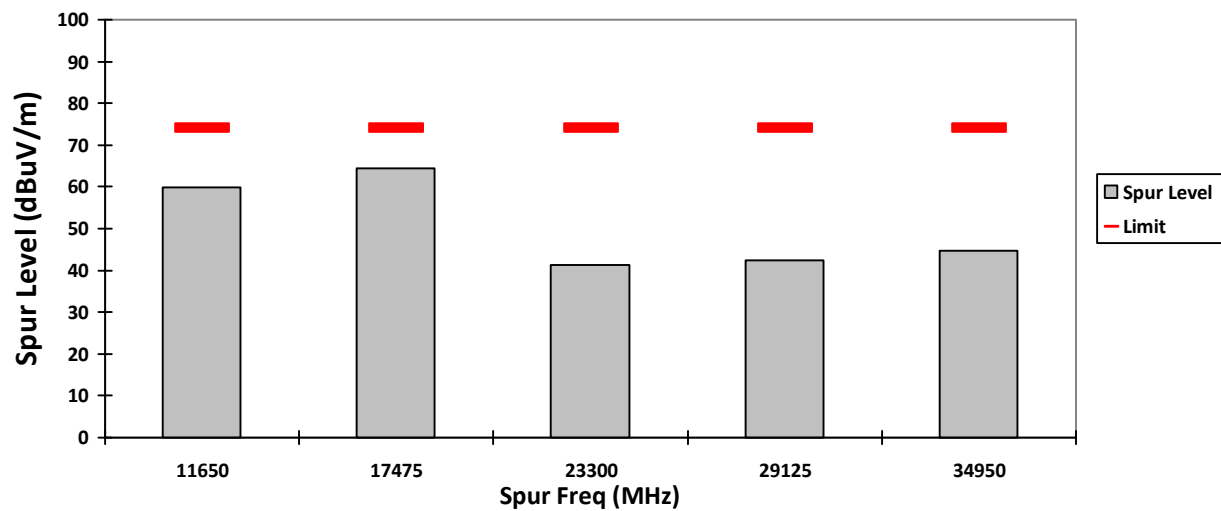
HORIZONTAL, QPK



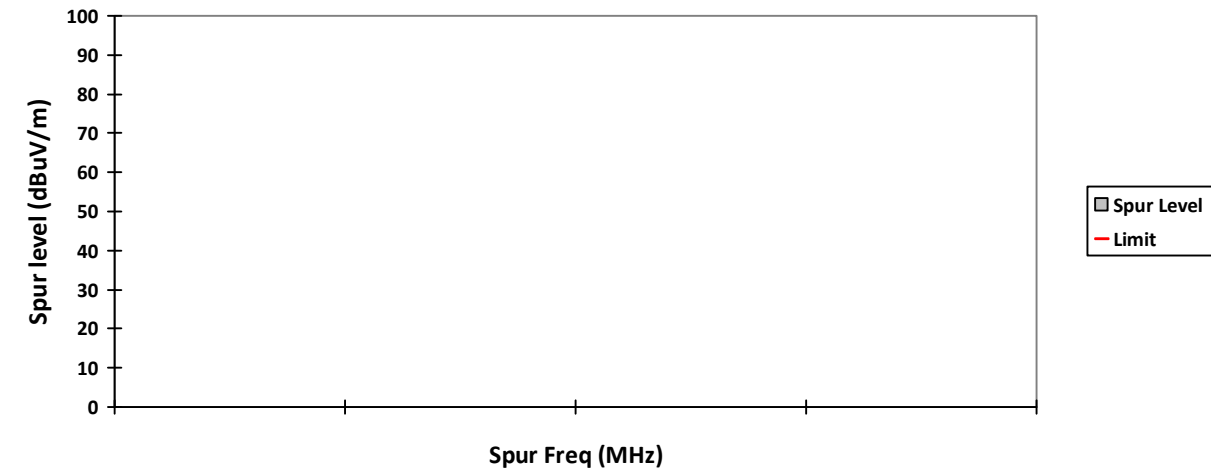
VERTICAL, PK



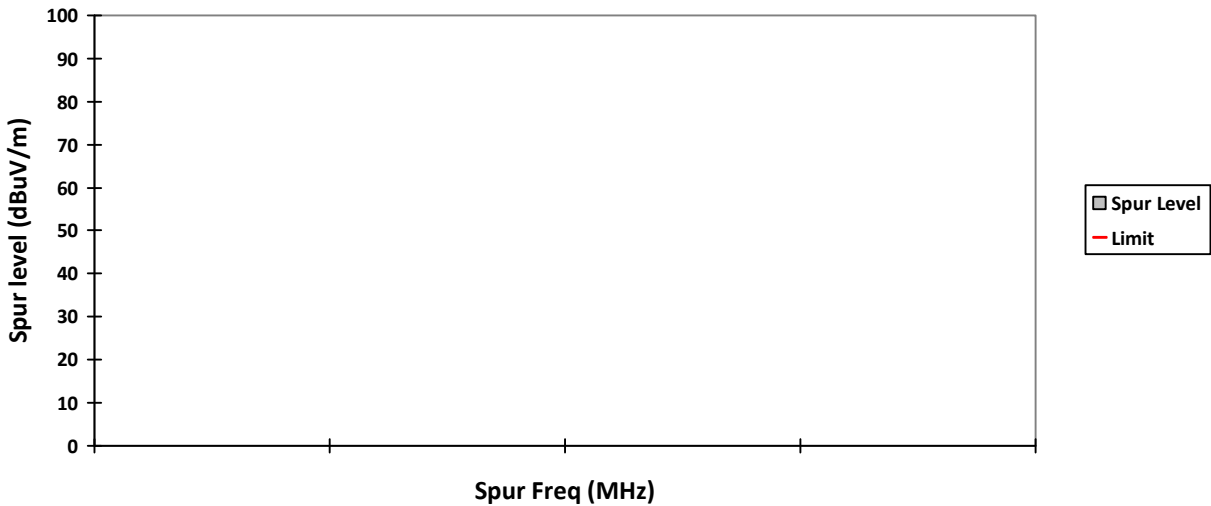
HORIZONTAL, PK



VERTICAL, AV



HORIZONTAL, AV



802.11n (HT20)

Test: WIFI SAC Transmitter Radiated Emission
Model#: DLR110NBHLAA **S/N: 55017XJ0059** **EMC SR ID#: 27179-EMC-00036**
Battery: PMNN4578A **Accessory: NA**
Test Channel: Low **Test Frequency: 5745.0000 MHz** **Test Standard: ANSI C63.10-2013**
Worst Case Plane: X-Plane (802.11n_20MHz)

Radiated Emission (Low Channel) tabular data

Vertical Radiated Emission Result										
Spur Freq (MHz)	Spur level QPK (dBμV/m)	Spur level PK (dBμV/m)	Spur level AV (dBμV/m)	Limit QPK (dBμV/m)	Limit PK (dBμV/m)	Limit AV (dBμV/m)	Margin QPK (dBμV/m)	Margin PK (dBμV/m)	Margin AV (dBμV/m)	Carrier PK Power (dBμV/m)
11490	-	58.4374**	-	-	74.0	-	-	15.5626**	-	-
17235	-	64.2239**	-	-	74.0	-	-	9.7761**	-	-
22980	-	40.6734**	-	-	74.0	-	-	33.3266**	-	-
28725	-	41.8976**	-	-	74.0	-	-	32.1024**	-	-
34470	-	45.0725**	-	-	74.0	-	-	28.9275**	-	-
Horizontal Radiated Emission Result										
11490	-	59.0806**	-	-	74.0	-	-	14.9194**	-	-
17235	-	64.5756**	-	-	74.0	-	-	9.4244**	-	-
22980	-	39.9922**	-	-	74.0	-	-	34.0078**	-	-
28725	-	41.8200**	-	-	74.0	-	-	32.1800**	-	-
34470	-	45.6358**	-	-	74.0	-	-	28.3642**	-	-

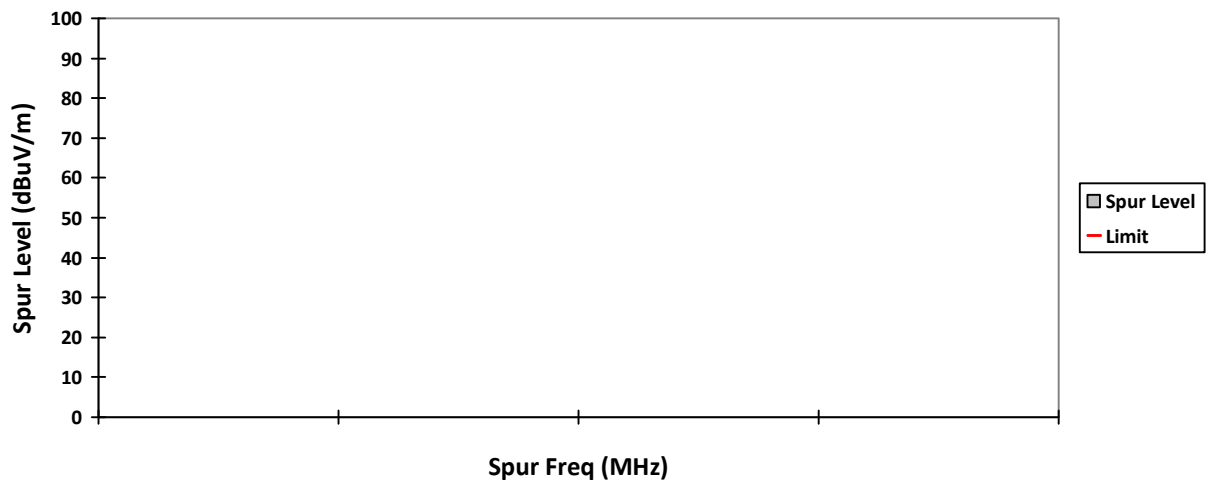
Remarks: Pass Result	Marginal Result	Fail Result
-------------------------	-----------------	-------------

Temperature (degC): 23.3
 Test Performed by: Nazrin&Qawiman
 System MU: 4.03dB

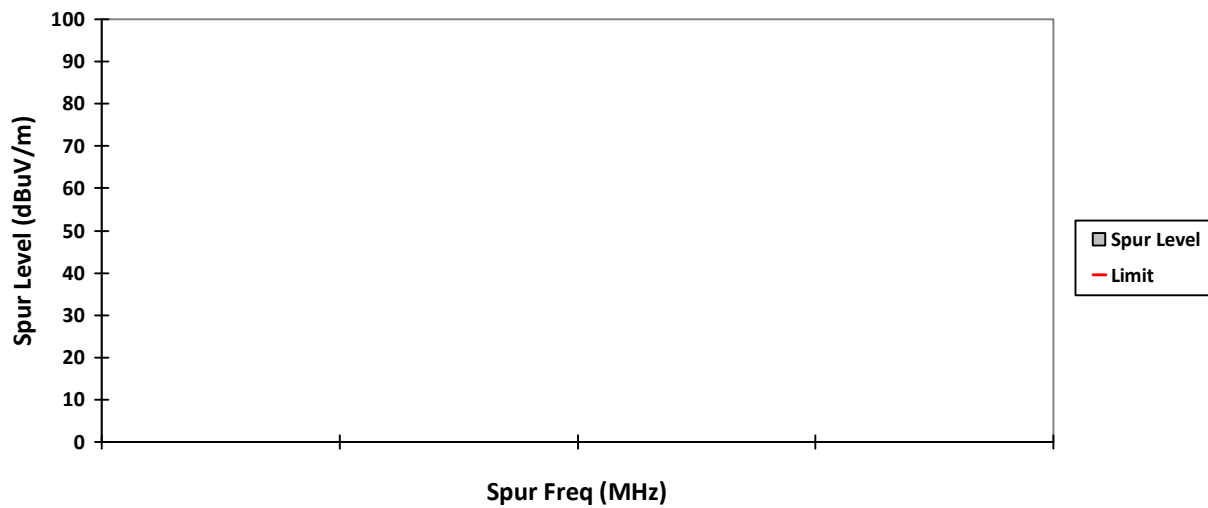
Humidity (%): 69.5
 Test Date: Tue, 29 Jun, 2021

Remarks: ** Indicates the spurious emission could not be detected due to noise limitations or ambient.
 *Pursuant to CFR 47 Part 2.1057 (c), emissions attenuated more than 20 dB below the permissible limit are not reported.

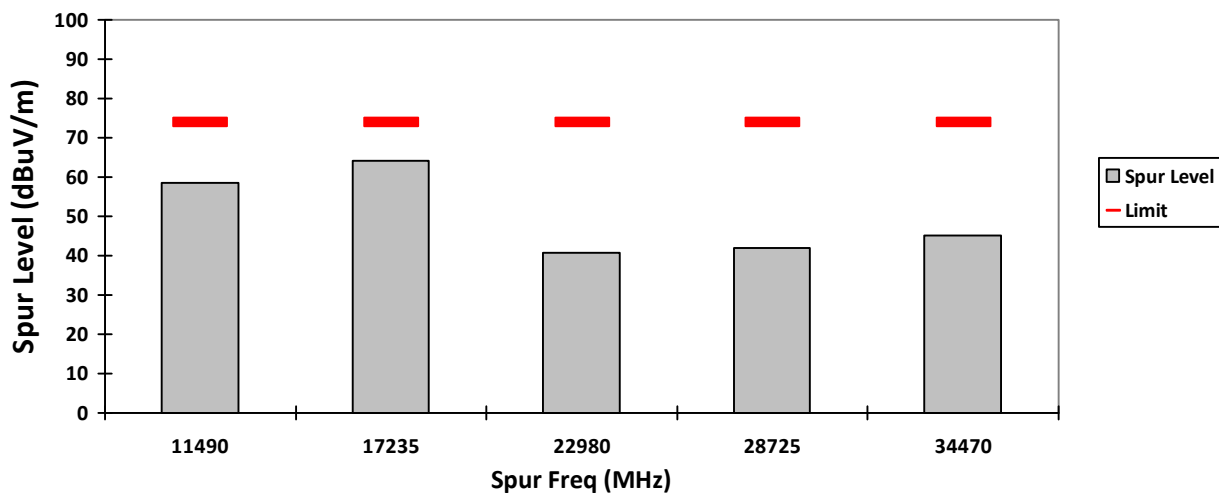
VERTICAL, QPK



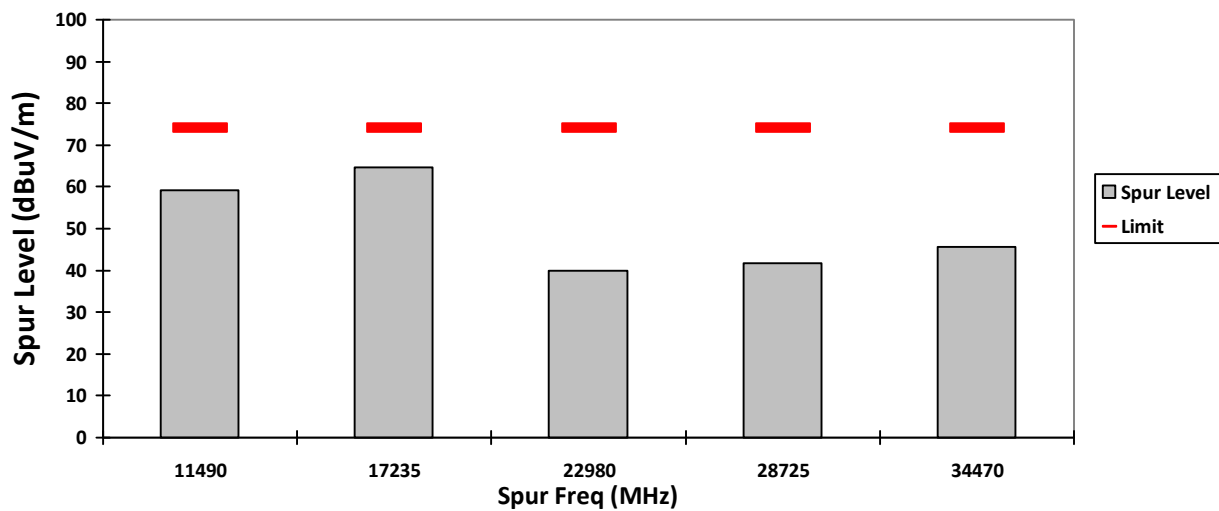
HORIZONTAL, QPK



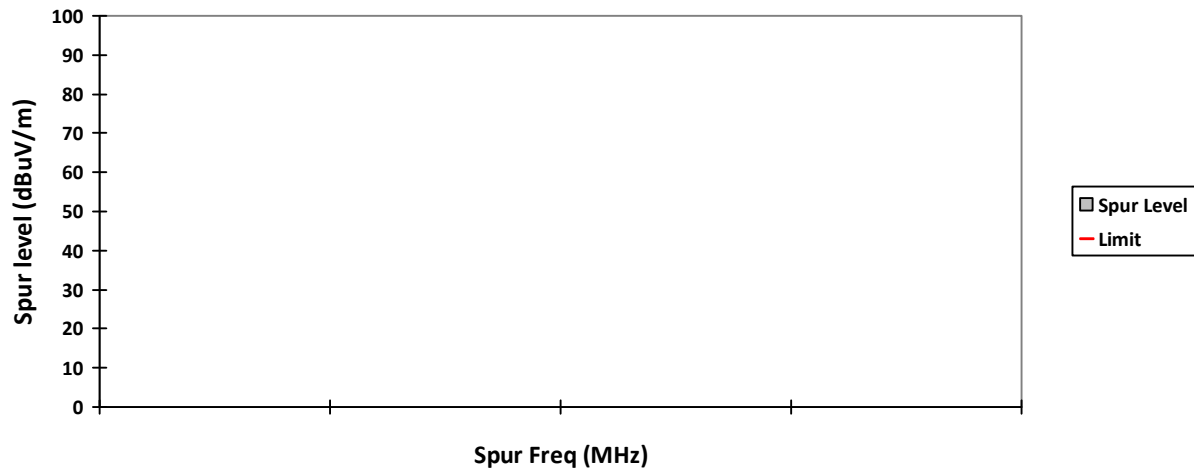
VERTICAL, PK



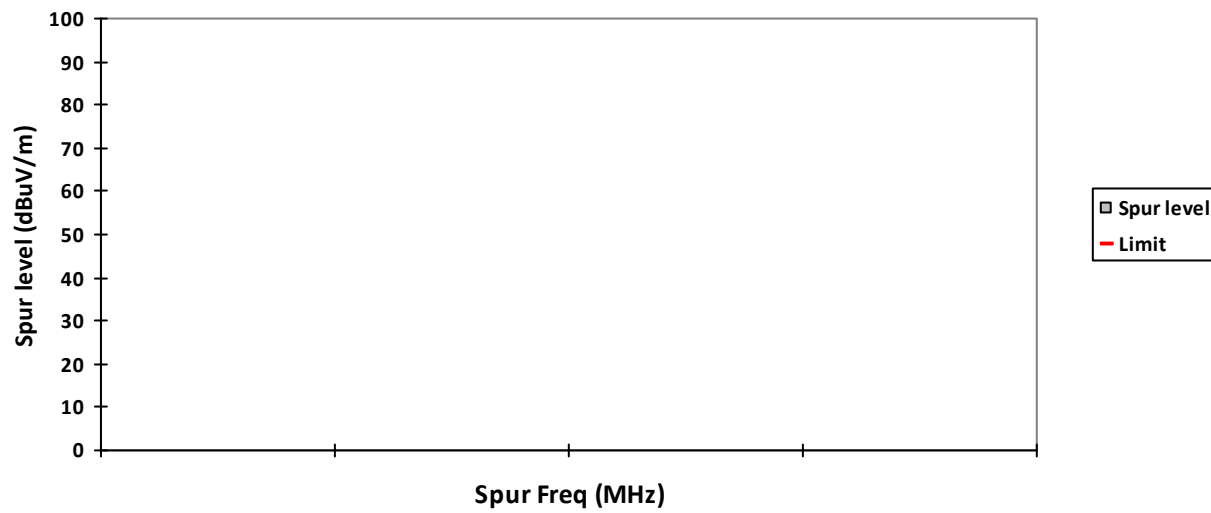
HORIZONTAL, PK



VERTICAL, AV



HORIZONTAL, AV



Test: WIFI SAC Transmitter Radiated Emission
Model#: DLR110NBHLAA **S/N: 55017XJ0059** **EMC SR ID#: 27179-EMC-00036**
Battery: PMNN4578A **Accessory: NA**
Test Channel: Mid **Test Frequency: 5785.0000 MHz** **Test Standard: ANSI C63.10-2013**
Worst Case Plane: X-Plane (802.11n_20MHz)

Radiated Emission (Mid Channel) tabular data

Vertical Radiated Emission Result										
Spur Freq (MHz)	Spur level QPK (dBμV/m)	Spur level PK (dBμV/m)	Spur level AV (dBμV/m)	Limit QPK (dBμV/m)	Limit PK (dBμV/m)	Limit AV (dBμV/m)	Margin QPK (dBμV/m)	Margin PK (dBμV/m)	Margin AV (dBμV/m)	Carrier PK Power (dBμV/m)
11570	-	58.0713**	-	-	74.0	-	-	15.9287**	-	-
17355	-	64.0051**	-	-	74.0	-	-	9.9949**	-	-
23140	-	41.3034**	-	-	74.0	-	-	32.6966**	-	-
28925	-	43.0241**	-	-	74.0	-	-	30.9759**	-	-
34710	-	46.2394**	-	-	74.0	-	-	27.7606**	-	-
Horizontal Radiated Emission Result										
11570	-	58.1487**	-	-	74.0	-	-	15.8513**	-	-
17355	-	64.6986**	-	-	74.0	-	-	9.3014**	-	-
23140	-	41.1766**	-	-	74.0	-	-	32.8234**	-	-
28925	-	42.6893**	-	-	74.0	-	-	31.3107**	-	-
34710	-	44.5370**	-	-	74.0	-	-	29.4630**	-	-

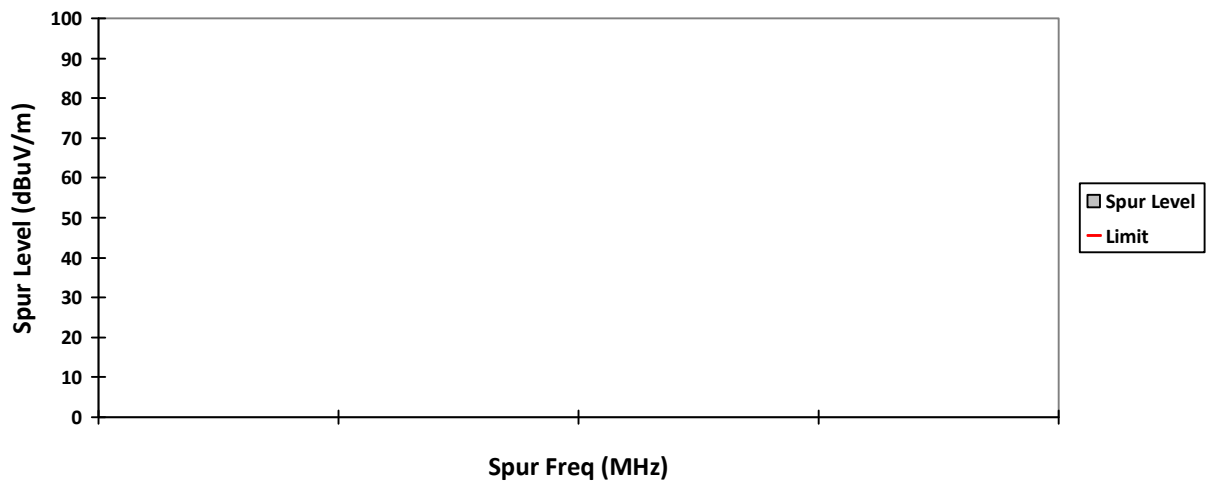
Remarks: Pass Result	Marginal Result	Fail Result
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Temperature (degC): 23.3
 Test Performed by: Nazrin&Qawiman
 System MU: 4.03dB

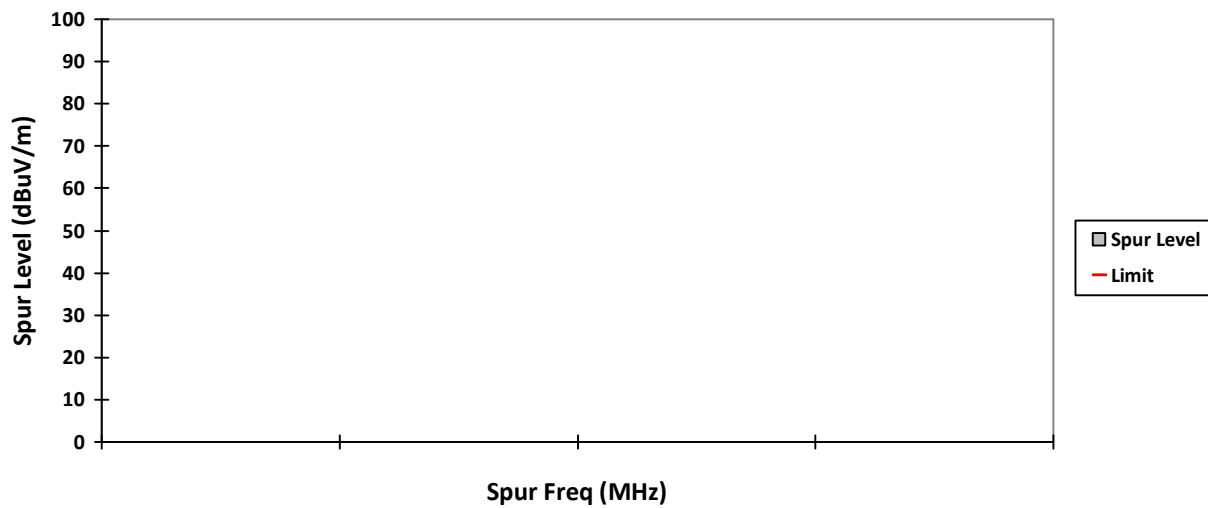
Humidity (%): 69.5
 Test Date: Tue, 29 Jun, 2021

Remarks: ** Indicates the spurious emission could not be detected due to noise limitations or ambient.
 *Pursuant to CFR 47 Part 2.1057 (c), emissions attenuated more than 20 dB below the permissible limit are not reported.

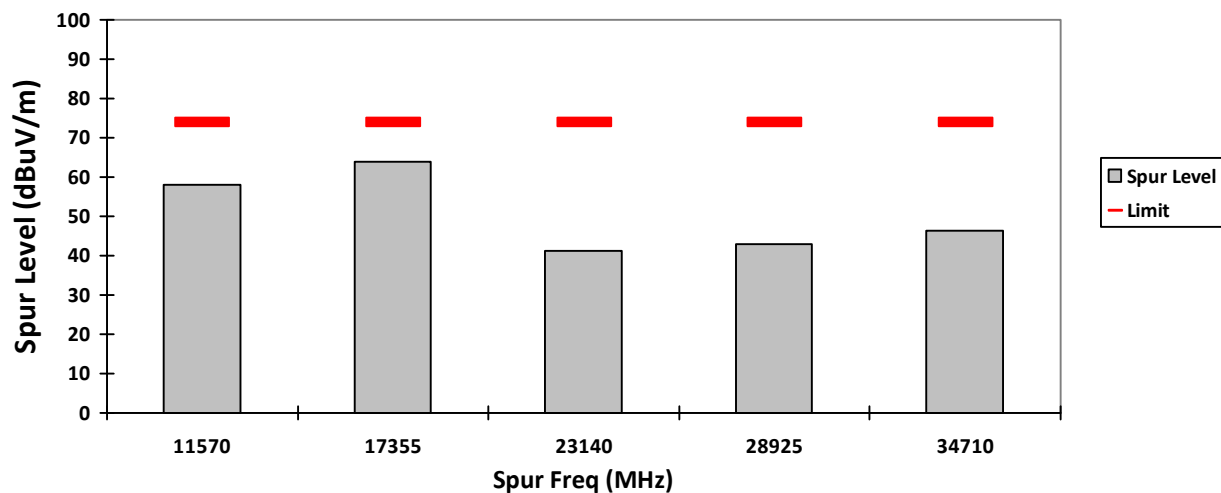
VERTICAL, QPK



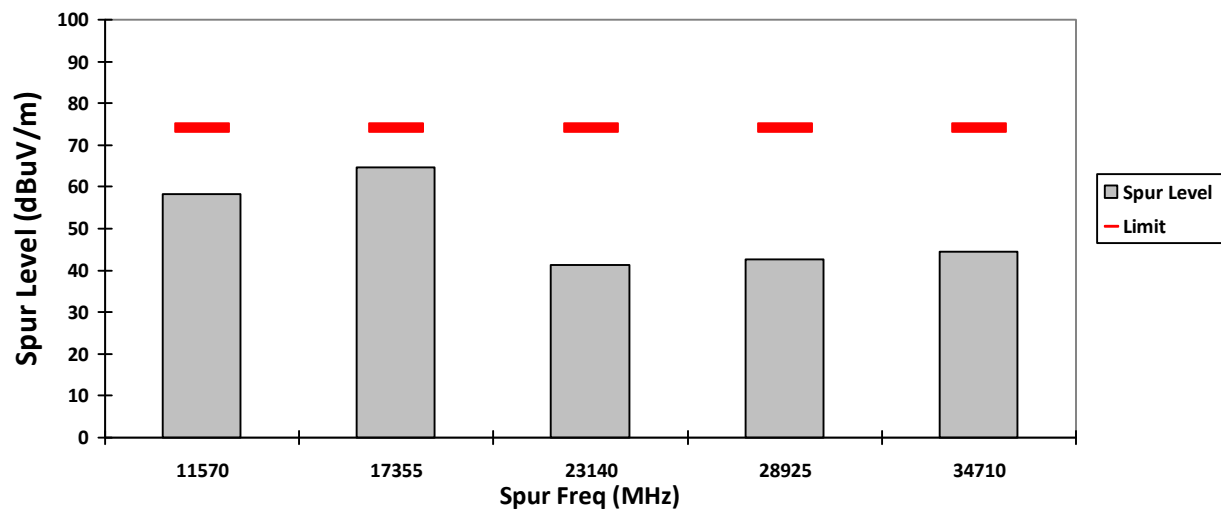
HORIZONTAL, QPK



VERTICAL, PK



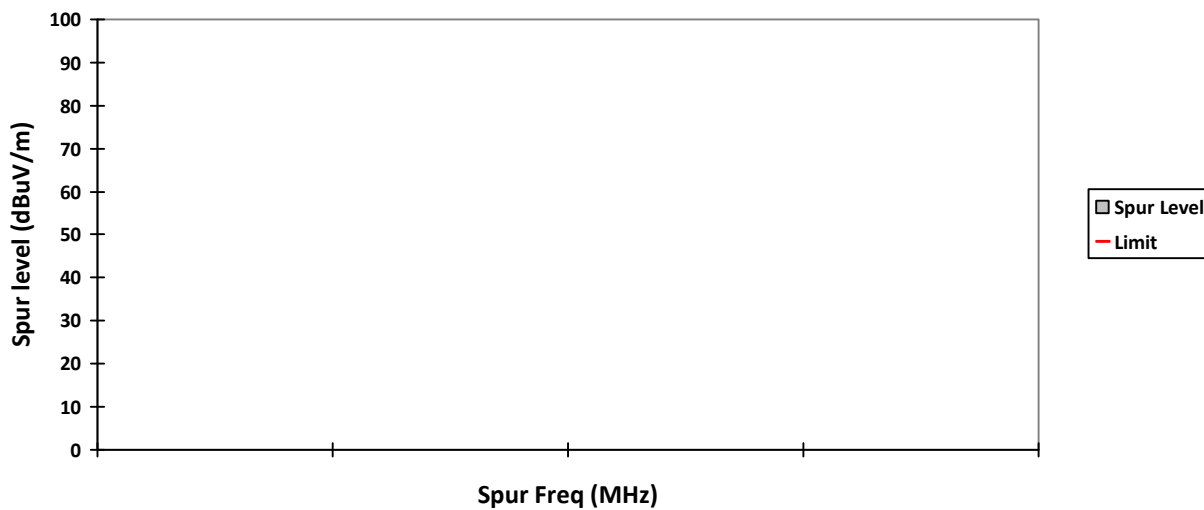
HORIZONTAL, PK



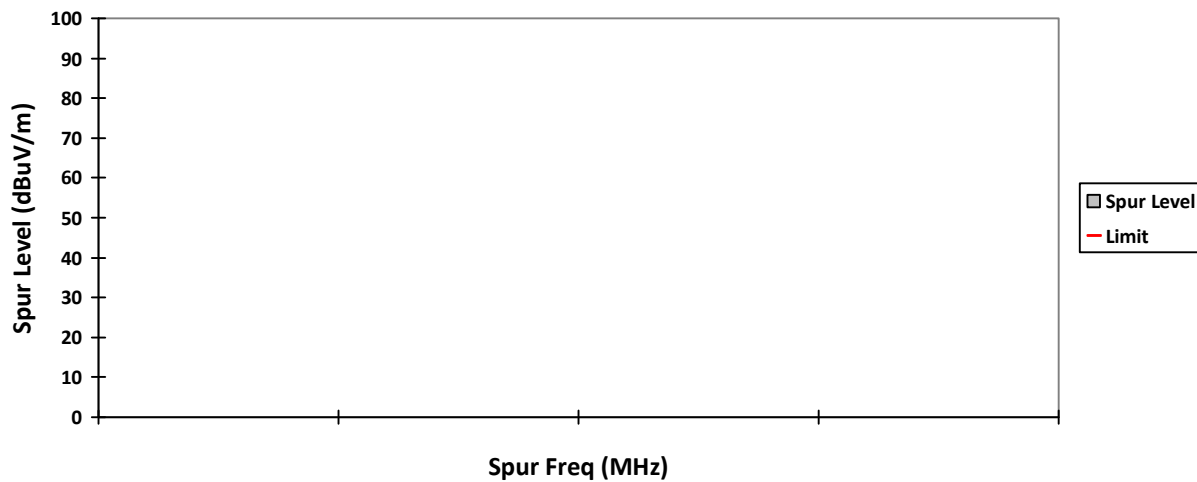
VERTICAL, AV



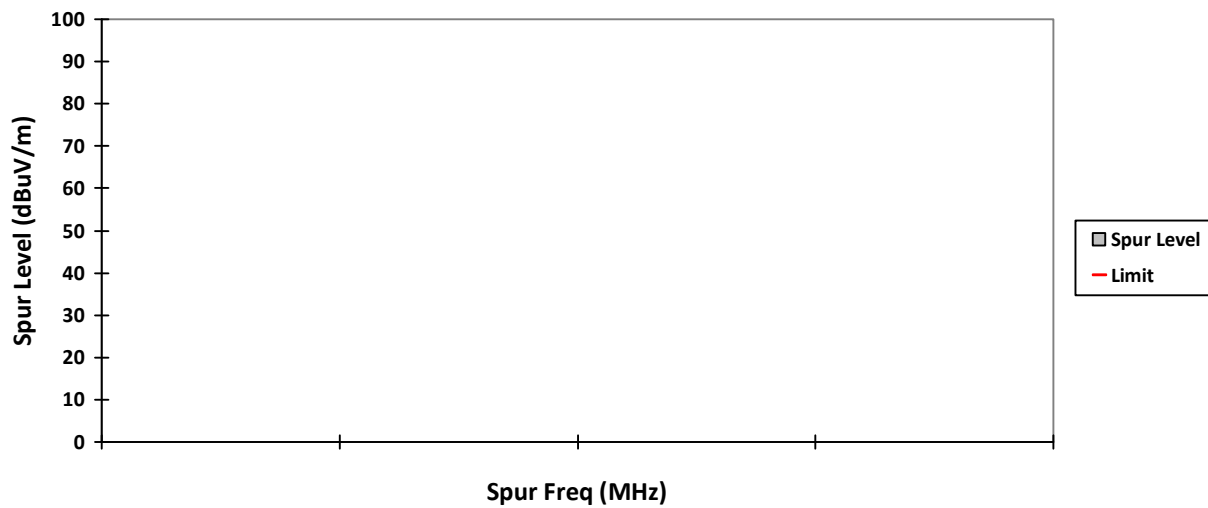
HORIZONTAL, AV



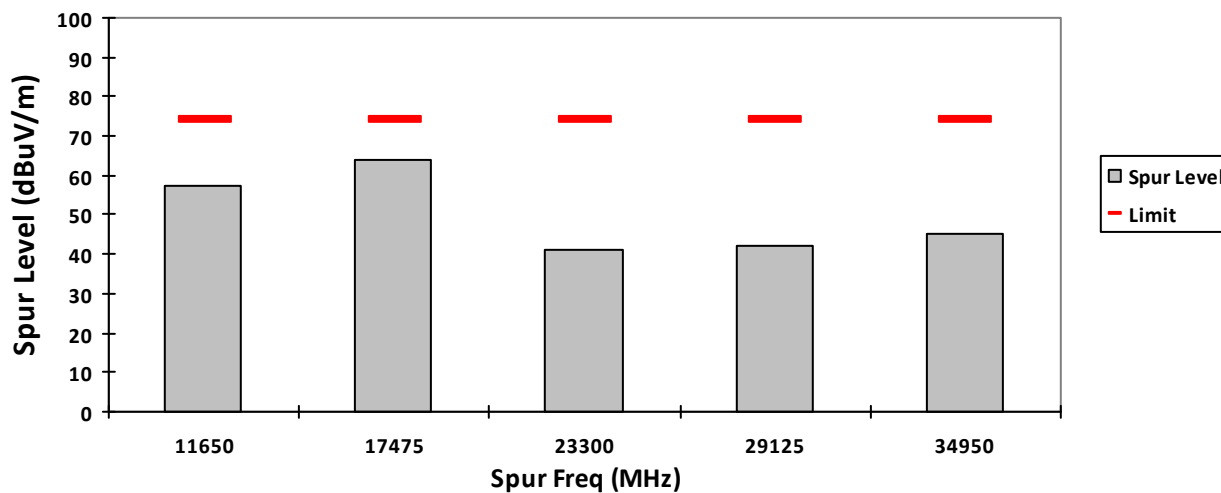
VERTICAL, QPK



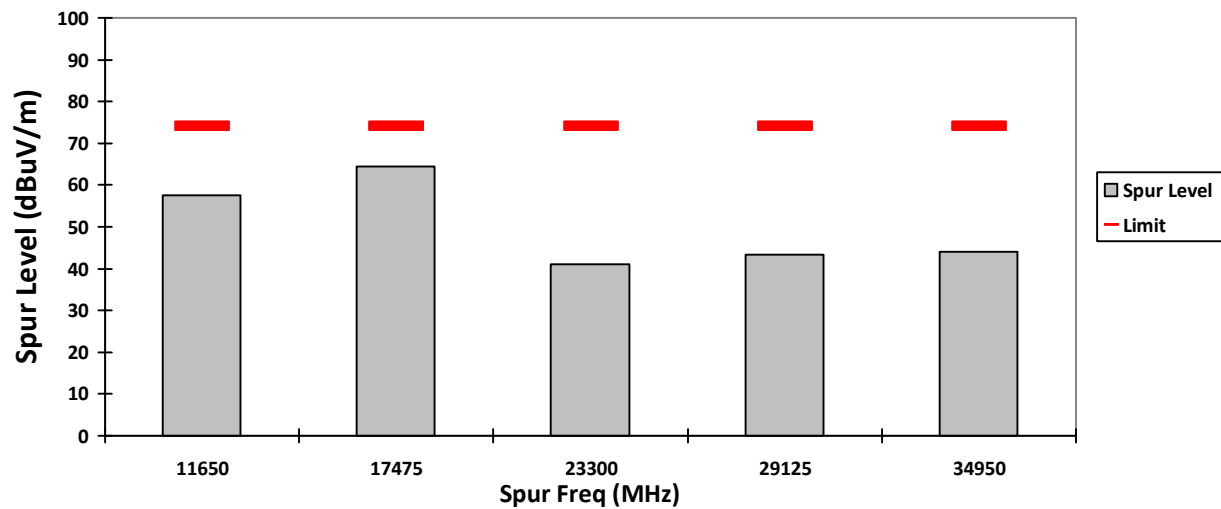
HORIZONTAL, QPK



VERTICAL, PK



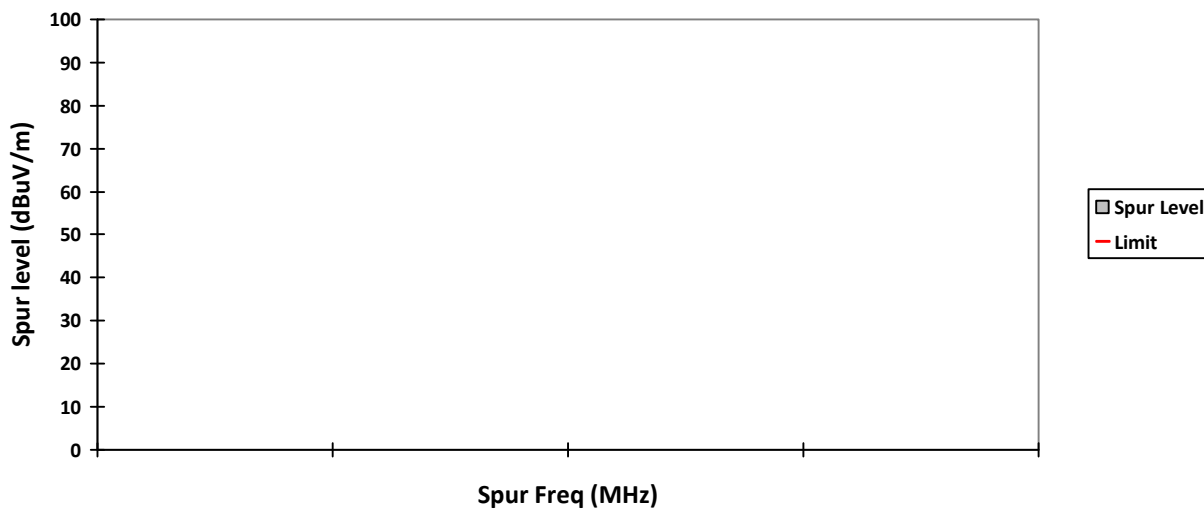
HORIZONTAL, PK



VERTICAL, AV



HORIZONTAL, AV



802.11n (HT40)

Test: WIFI SAC Transmitter Radiated Emission
Model#: DLR110NBHLAA **S/N: 55017XJ0059** **EMC SR ID#: 27179-EMC-00036**
Battery: PMNN4578A **Accessory: NA**
Test Channel: Low **Test Frequency: 5755.0000 MHz** **Test Standard: ANSI C63.10-2013**
Worst Case Plane: X-Plane (802.11n_40MHz)

Radiated Emission (Low Channel) tabular data

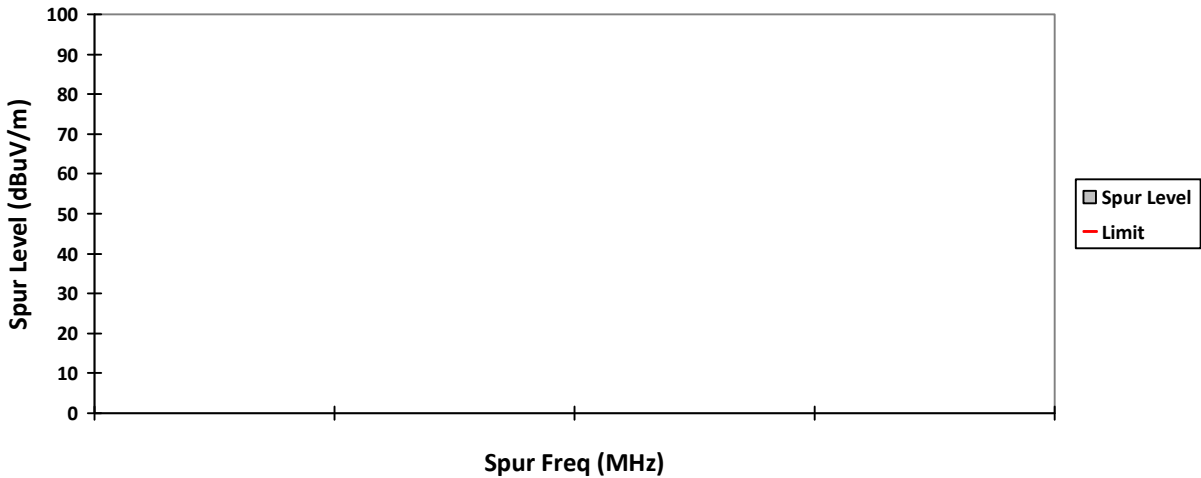
Vertical Radiated Emission Result										
Spur Freq (MHz)	Spur level QPK (dBμV/m)	Spur level PK (dBμV/m)	Spur level AV (dBμV/m)	Limit QPK (dBμV/m)	Limit PK (dBμV/m)	Limit AV (dBμV/m)	Margin QPK (dBμV/m)	Margin PK (dBμV/m)	Margin AV (dBμV/m)	Carrier PK Power (dBμV/m)
11510	-	58.1282**	-	-	74.0	-	-	15.8718**	-	-
17265	-	63.3503**	-	-	74.0	-	-	10.6497**	-	-
23020	-	40.6600**	-	-	74.0	-	-	33.3400**	-	-
28775	-	42.5579**	-	-	74.0	-	-	31.4421**	-	-
34530	-	44.8136**	-	-	74.0	-	-	29.1864**	-	-
Horizontal Radiated Emission Result										
11510	-	58.9722**	-	-	74.0	-	-	15.0278**	-	-
17265	-	63.4514**	-	-	74.0	-	-	10.5486**	-	-
23020	-	39.1179**	-	-	74.0	-	-	34.8821**	-	-
28775	-	42.2413**	-	-	74.0	-	-	31.7587**	-	-
34530	-	43.8156**	-	-	74.0	-	-	30.1844**	-	-

Remarks: Pass Result	Marginal Result	Fail Result
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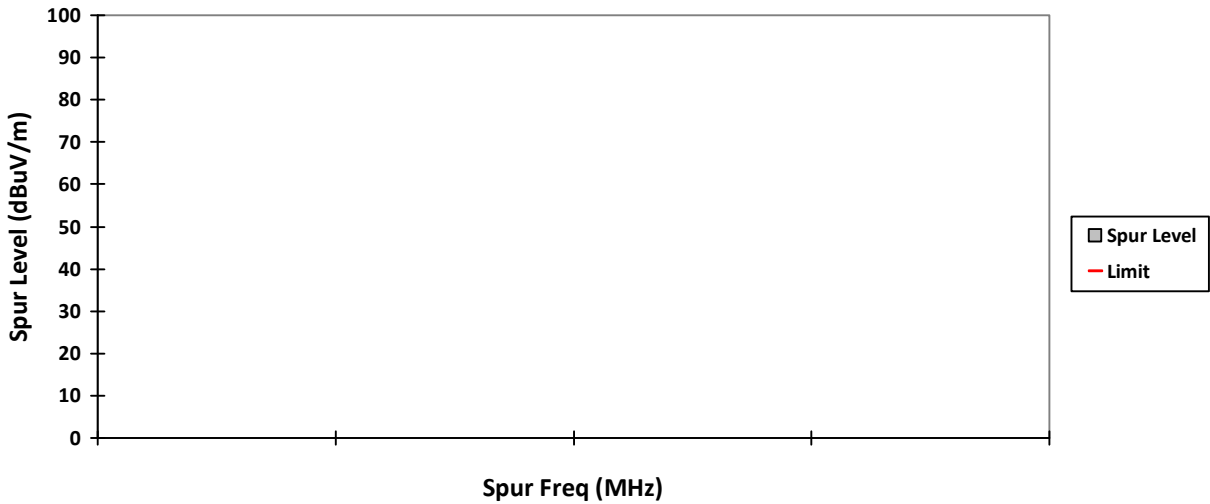
Temperature (degC): 23.3 **Humidity (%): 69.5**
Test Performed by: Nazrin&Qawiman **Test Date: Tue, 29 Jun, 2021**
System MU: 4.03dB

Remarks: ** Indicates the spurious emission could not be detected due to noise limitations or ambient.
***Pursuant to CFR 47 Part 2.1057 (c), emissions attenuated more than 20 dB below the permissible limit are not reported.**

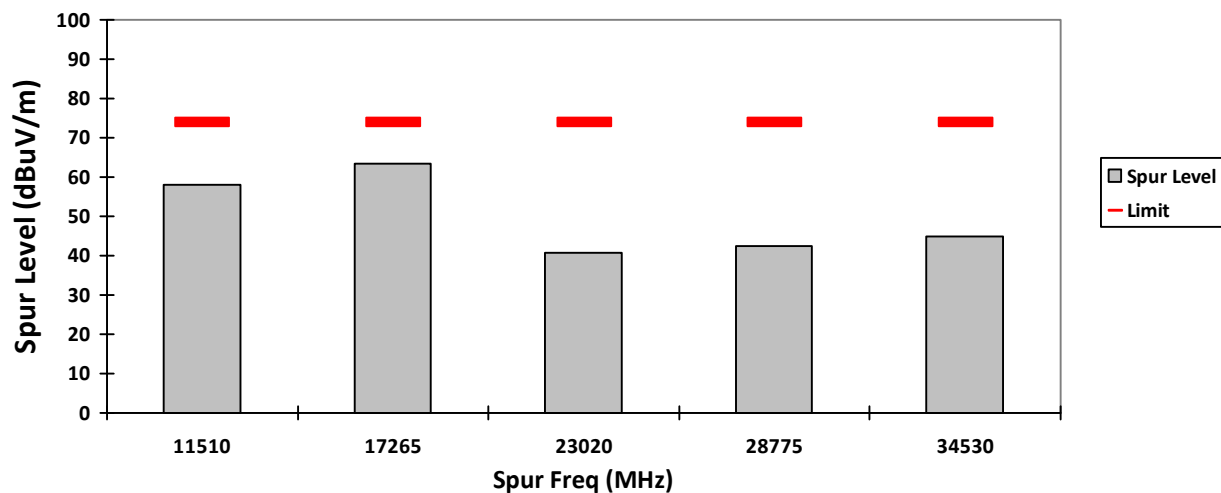
VERTICAL, QPK



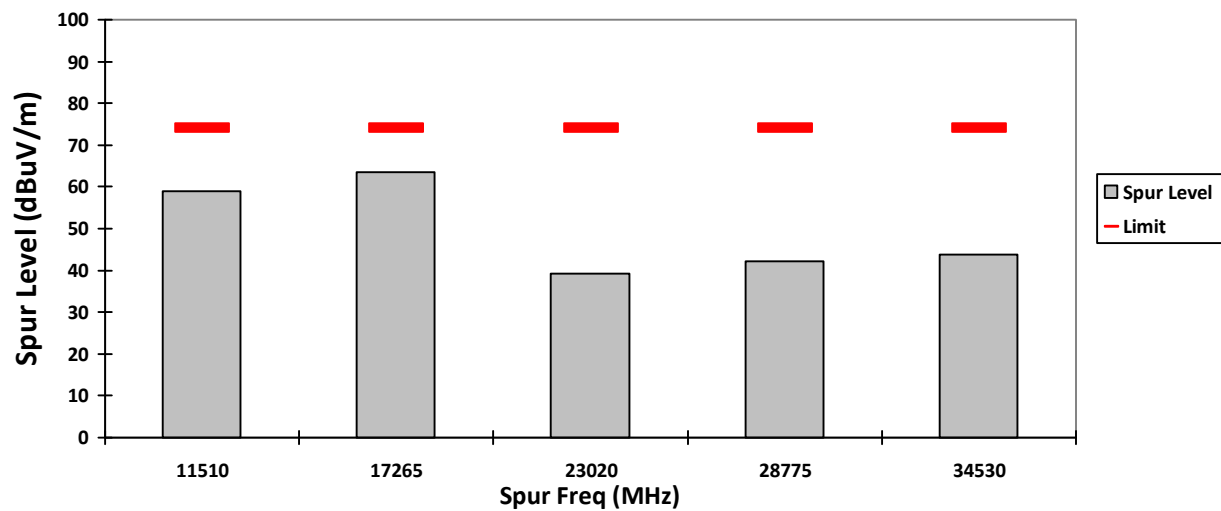
HORIZONTAL, QPK



VERTICAL, PK



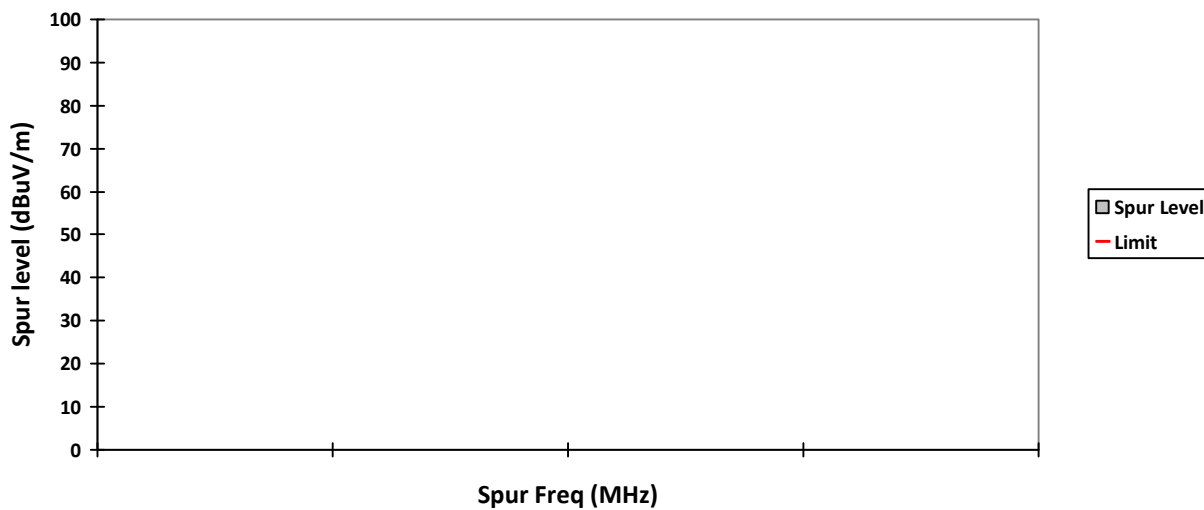
HORIZONTAL, PK



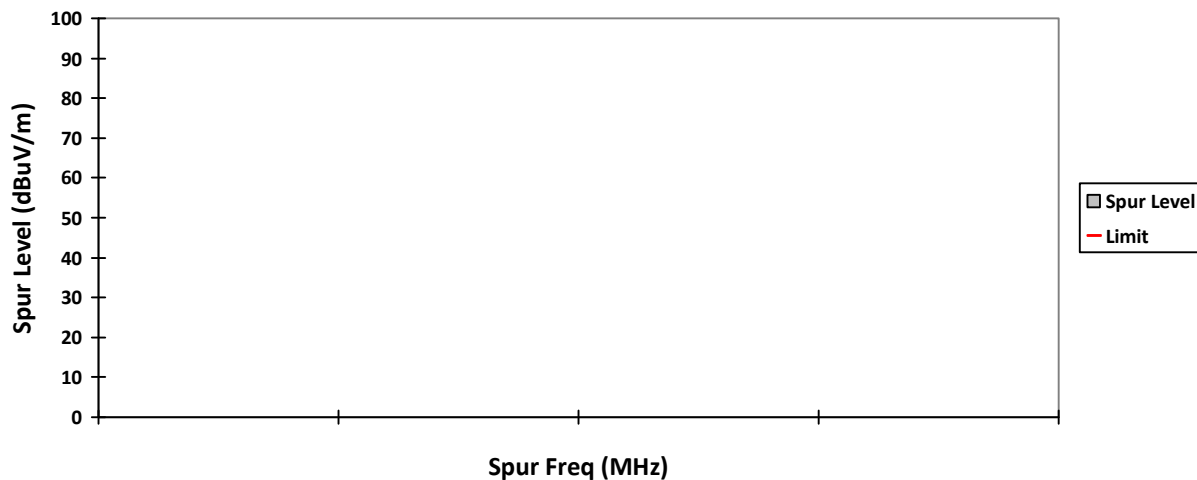
VERTICAL, AV



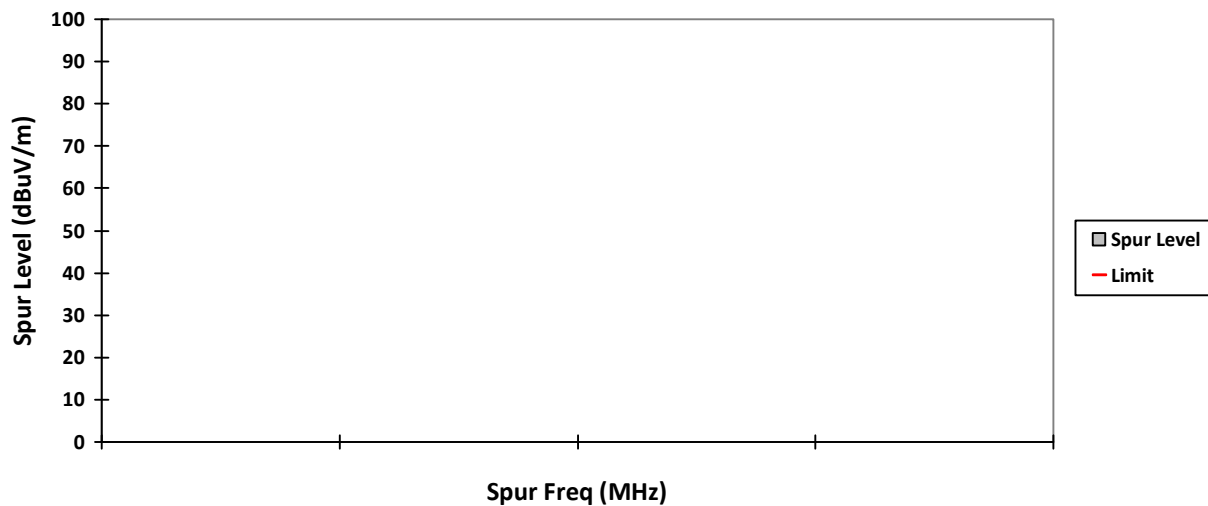
HORIZONTAL, AV



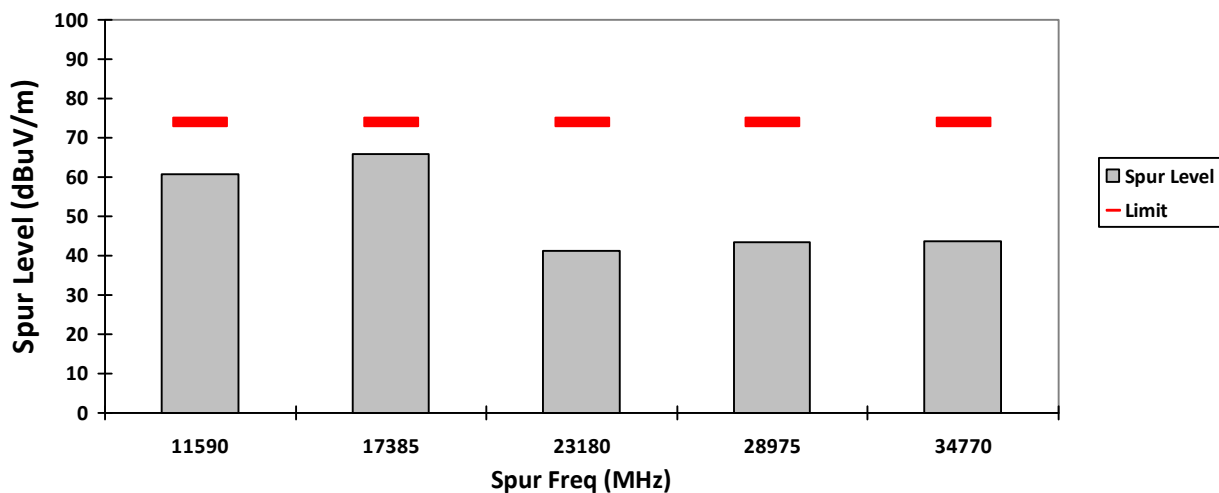
VERTICAL, QPK



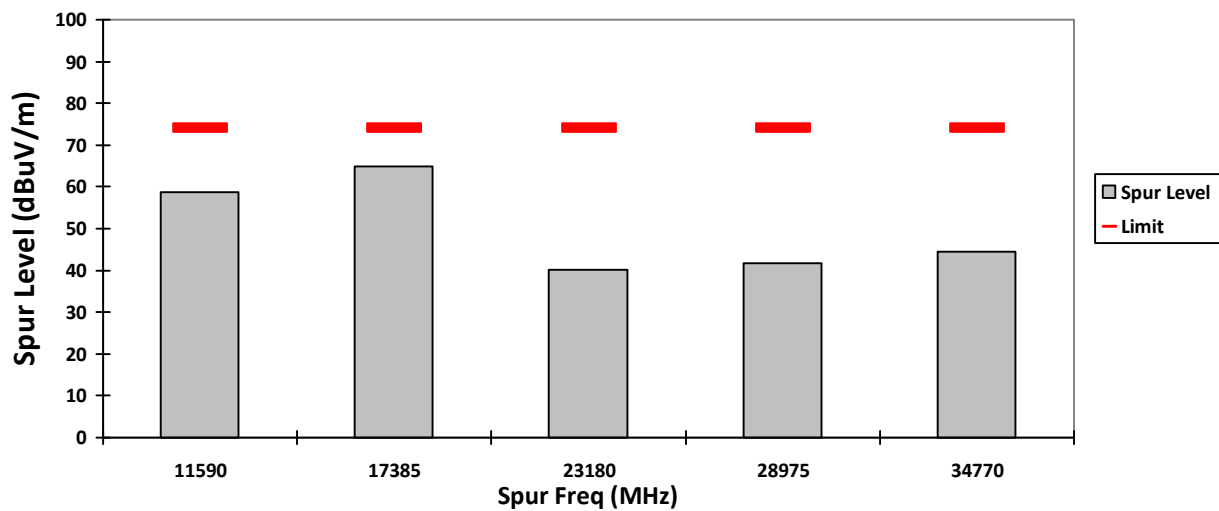
HORIZONTAL, QPK



VERTICAL, PK



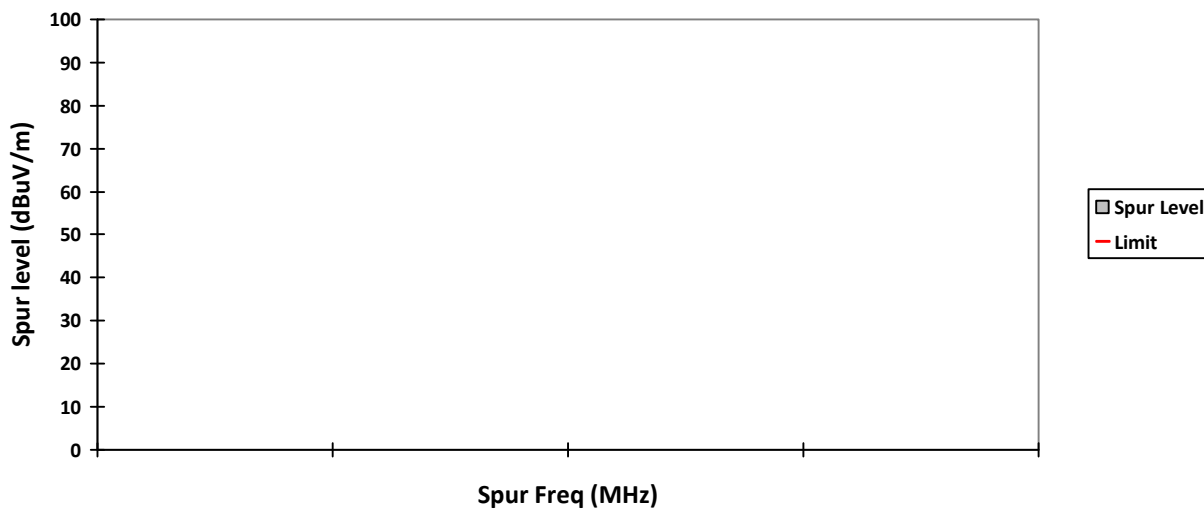
HORIZONTAL, PK



VERTICAL, AV

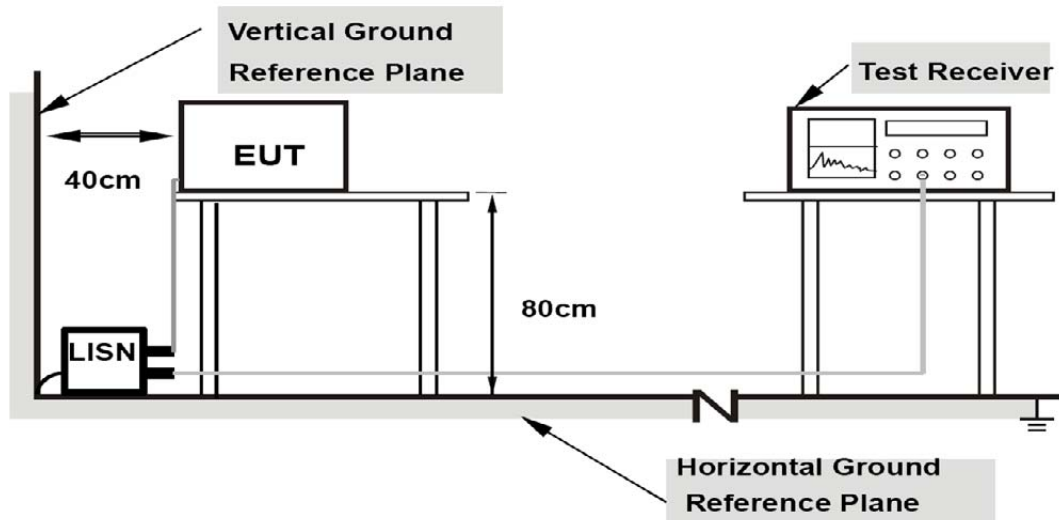


HORIZONTAL, AV



6.8. AC Powerline Conducted Emission

6.8.1. Test Setup



- 1) Tests were conducted for both Receive and Transmit Mode of the EUT.
- 2) The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/50uH of coupling impedance for the measuring instrument.
- 3) Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- 4) The frequency range from 150 kHz to 30MHz was measured.

6.8.2. Test Limits

For AC Power Line Conducted Test Limit can be Class A or B depends on product classification.

**Limits for conducted disturbance at the mains ports
of class A ITE**

Frequency range MHz	Limits dB(μV)	
	Quasi-peak	Average
0,15 to 0,50	79	66
0,50 to 30	73	60
NOTE The lower limit shall apply at the transition frequency.		

Table 1: Limits for Conducted Disturbance at the Mains Ports of Class A ITE.

**Limits for conducted disturbance at the mains ports
of class B ITE**

Frequency range MHz	Limits dB(μ V)	
	Quasi-peak	Average
0,15 to 0,50	66 to 56	56 to 46
0,50 to 5	56	46
5 to 30	60	50
NOTE 1 The lower limit shall apply at the transition frequencies.		
NOTE 2 The limit decreases linearly with the logarithm of the frequency in the range 0,15 MHz to 0,50 MHz.		

Table 2: Limits for Conducted Disturbance at the Mains Ports of Class B ITE

6.8.3. Test Data

Not Applicable

END OF TEST REPORT