



Electromagnetic Compatibility Test Report

Test Report No: MOT 061107

Issued on: November 06, 2007

Product Name

VoWLAN

Tested According to

**FCC 47 CFR, Part 15, Subparts C, Bluetooth
IC RSS-210**

Tests Performed for

Motorola Israel Ltd.

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Tel: (972) 03-5658888

QualiTech EMC Laboratory

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Petah-Tikva, 49517, Israel
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Regis. No: 102724 1633.01

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1633.01

Test Report details:

Test commencement date: 04.11.2007
Test completion date: 06.11.2007
Customer's Representative: Teddy Neeman
Issued on: 06.11.2007

Assessment information:

This report contained an assessment of the EUT against Electromagnetic Compatibility based upon tests carried out on the samples submitted. The results contained in this report relate only to the items tested. Manufactured products will not necessarily give identical results due to production and measurement tolerances. QualiTech, EMC Lab does not assume responsibility for any conclusion and generalization drawn from the test results with regards to other specimens or samples of type of the equipment represented by test item.

The EUT was set up and exercised using the configuration, modes of operation and arrangements defined in this report only.

Modifications:

Modifications made to the EUT

None

Modifications made to the Test Standard

None

Summary of Compliance Status

Bluetooth

Test Spec. Clause	Test Case	Remarks
47 CFR §15.247 (a) (1), DA 00-705, RSS-210 section A8.1 (2)	20dB Bandwidth	Comply
47 CFR §15.247 (a) (1), DA 00-705, RSS-210 section A8.1 (2)	Carrier Frequency Separation	Comply
47 CFR §15.247 (a) (1)(iii), DA 00-705, RSS-210 section A8.1 (2)	Number of Hopping Channels	Comply
47 CFR §15.247 (a) (1) (iii), DA 00-705, RSS-210 section A8.1 (2)	Average Time of Occupancy (Dwell Time)	Comply
47 CFR §15.247 (b) (1), DA 00-705, RSS-210 section A8.1 (2)	Maximum Peak Output Power	Comply
47 CFR §15.247 (d), DA 00-705, RSS-210 Section A8.5	Band-edge compliance of RF Conducted Emission	Comply
47 CFR §15.247 (d), §15.209(a) & DA 00-705, RSS-210 Section A8.5	Radiated Spurious Emissions, Restricted Bands (2310-2390MHz, 2483.5-2500MHz)	Comply
47 CFR §15.247 (d) , §15.209(a) & DA 00-705, RSS-210 Section A8.5	Radiated Spurious Emissions, Restricted Bands	Comply
47 CFR §15.247 (d), DA 00-705, RSS-210 Section A8.5	Spurious Emission- Conducted	Comply
47 CFR §15.203, RSS-Gen, Section 7.1.4	Antenna Connector Requirements	Comply

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1. General Description

Description of the EUT system/test Item:

Product name: VoWLAN

Model: F2977A

FCC ID: AZ489FT7031

IC: 109U-89FT7031

Description:

Single Mode VoWLAN 802.11a/b/g phone

Maximum Peak Output Power:

2.51mW for BT

Frequency range:

Bluetooth: 2.402- 2.480 GHz

Type of Modulation:

Protocol	Modulation
Bluetooth	8-PSK,GFSK,DQPSK

Antenna Specification:

Type:

Bluetooth: Integral (on board) PIFA single Band

Gain:

Bluetooth: 0dBi

2. Method of Measurements

2.1. Conducted RF Measurements:

The RF output of the transmitter under test was directly connected to the input of the Spectrum analyzer through a specialized antenna connector provided by the manufacturer, and an attenuator as specified. The external attenuator and cable loss were added to the reading. Worst-case results of the various modulation modes (where applicable) were reported.

For carrier frequency separation, number of hopping frequencies, time of occupancy, 20dB BW, peak output power, band edge emissions, and spurious emissions were measured according the guidelines in DA 00-705.

For PSD, emission peak was zoomed within the pass band with spectrum analyzer's settings as reported (Sweep time=Span/3kHz). Transmitter outputs transmitting simultaneously were aggregated through a combiner.

For Maximum Conducted Output Power, the spectrum analyzer was set for free ran, and 100 traces were averaged in power averaging mode. The transmitter was continuously transmitting, at a duty cycle of about 99%, and power was integrated across a bandwidth of the 26dB EBW of the signal, using the spectrum analyzer's band power measurement function with band limits set equal to the EBW band edges. Alternatively, Peak Output Power was measured using a Peak Power Meter.

For spurious emissions measurement, the spectrum from 9 KHz to 40GHz was investigated with the transmitter set to the lowest, middle and highest channel frequencies.

2.2. Radiated Emissions Measurements in the restricted bands:

For radiated emissions, which fall in the restricted bands the spectrum from 1MHz to 25GHz was investigated following the guidelines in ANSI C63.4-2003, with the transmitter set to the lowest, middle and highest channel frequencies. Measurements were performed with peak detector and repeated averaged with VBW=10Hz.

2.3. Radiated Emission measurements:

Measurements were performed at a 3-meter measurement distance in the semi-anechoic chamber in order to evaluate the radiated electromagnetic interference characteristics of the EUT. The EUT was placed on a non-metallic table/support, 0.8m above the turntable, was configured, arranged and operated in a manner consistent with typical application and load conditions. The test program of exercising the equipment ensured that various parts of the EUT were exercised to permit detection of all EUT disturbances.

An appropriate antenna depending upon the frequency range, per ANSI C63.4-2003 clause 4.1.5 was used. While the turntable was being rotated, the height of the antenna was varied from 1 to 4m for the frequency range of 30MHz to 1GHz. The highest radiated emission was detected by manipulating the system cables to the worst-case position. This process was repeated for both antenna polarizations. The spectrum up to 40GHz was investigated for spurious emissions, using a band-reject filter where appropriate.

The amplitudes of worst-case emission were measured with the detector modes and resolution bandwidths over various frequency ranges according to the requirements of ANSI C63.4-2003 clause 4.2.

2.4. Worst Case Results:

Worst case result is determined as the channel with the highest output power. Pre-scan has been conducted to determine the worst-case. Worst-case results of various modulation modes/data rates were determined as the modulation with the highest output power, and that was reported.

3. Test Facility & Uncertainty of Measurement

3.1. Accreditation/ Registration reference:

- A2LA Certificate Number: 1633.01

3.2. Test Facility description

The tests were performed at the EMC Laboratory, QualiTech Division, ECI Telecom Group

Address: 30, Hasivim St., Petah Tikva, Israel.
Tel: 972-3-926-8443

3m Anechoic Chamber:

The 3m-screened chamber is used in two configurations: the semi-anechoic configuration for Radiated Emission measurements and the full-anechoic configuration for Radiated Immunity tests.

Semi Anechoic Configuration:

Measurement distance	3m
Chamber dimensions	9.5m x 6.5m x 5.2m
Antenna height	1 - 4m
Shielding Effectiveness	Magnetic field ≥ 80 dB at 15 kHz ≥ 90 dB at 100 kHz Electric field > 120 dB from 1MHz to 1GHz > 110 dB from 1GHz to 10GHz
Absorbing material	Ferrite tiles on the walls and ceiling Frankonia hybrid absorbing material in selected positions on the walls
Normalized Site Attenuation measured at 5 positions	± 3.49 dB, 30MHz to 1GHz
Transmission Loss measured at 5 positions, at 1.5m height	± 3 dB, 1GHz to 18GHz

Full-Anechoic Configuration:

Measurement distance	3m
Chamber dimensions	7m x 4m x 3m
Antenna height	1.55m at Horizontal & Vertical polarizations
Shielding Effectiveness	Magnetic field ≥ 80 dB at 15 kHz ≥ 90 dB at 100 kHz Electric field > 120 dB from 1MHz to 1GHz > 110 dB from 1GHz to 10GHz
Absorbing material	Ferrite tiles on the walls and ceiling Frankonia hybrid absorbing material in selected positions on the walls and floor
Field Uniformity to EN61000-4-3	± 3 dB 80MHz to 18GHz

3.3. Uncertainty of Measurement:

Test Name	Test Method & Range	Uncertainty	
		Combined std. Uc(y) [dB]	Expanded U [dB]
Radiated Emission	30MHz÷230MHz, Horiz. polar.	1.8	3.6
	30MHz÷230MHz, Ver. polar.	2.0	3.9
	230MHz÷1000MHz, Horiz. polar.	1.5	3.0
	230MHz÷1000MHz, Vert. polar.	1.5	3.0
Conducted Emission	9 kHz÷150 kHz	1.4	2.8
	150 kHz÷30MHz	1.1	2.2

4. Bluetooth: Report of Measurements and examinations

Note: All tests were performed on DQPSK modulation.

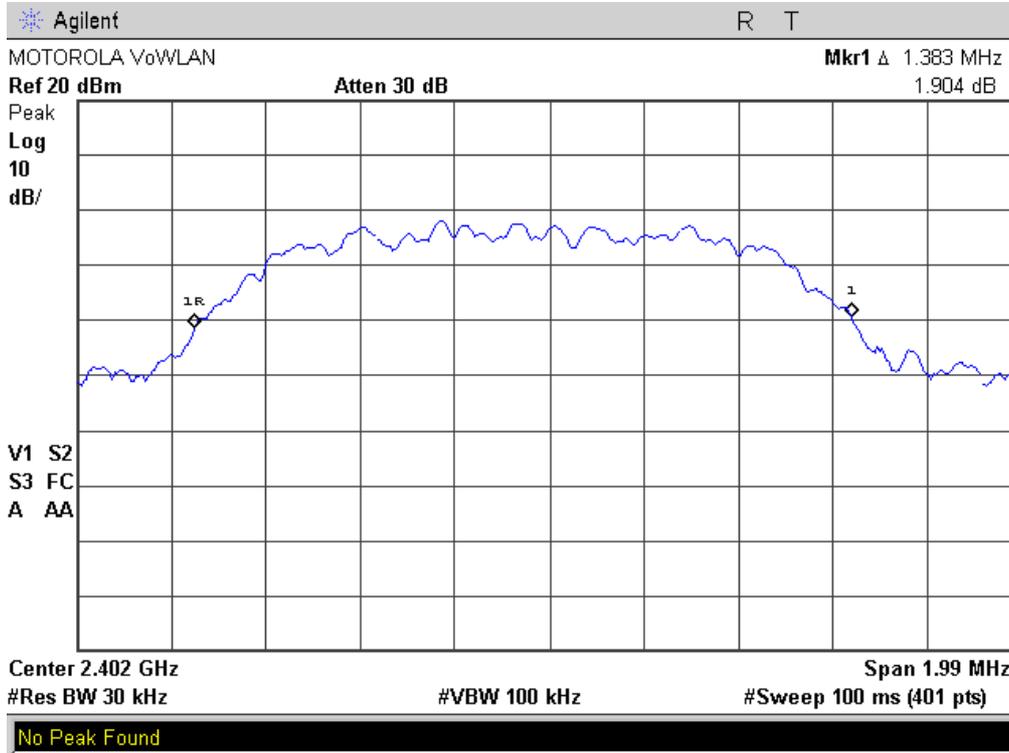
4.1. 20dB Bandwidth

Reference document:	47 CFR §15.247 (a) (1) & DA 00-705		
Test Requirements:	20dB Bandwidth of the hopping channel		
Test setup:	See Sec. 2.1	Pass	
Operating conditions:	Under normal test conditions		
Method of testing:	Conducted		
S.A. Settings:	RBW: 30kHz, VBW: 100kHz, Span: 2MHz		
Hopping function:	Disabled		
Environment conditions:	Ambient Temperature: 22°C	Relative Humidity: 48%	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	See Plot 4.1.1 – Plot 4.1.3	

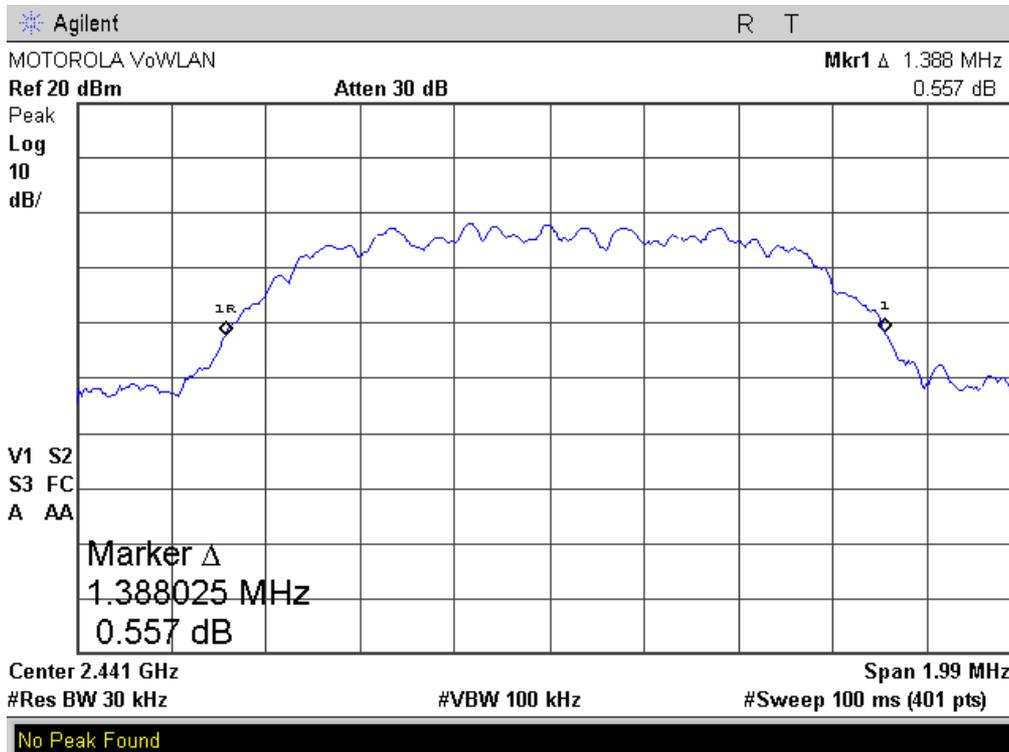
Test results:

Frequency [GHz]	20dB BW [kHz]	Reference Plots
2.402	1383	4.1.1
2.441	1388	4.1.2
2.480	1378	4.1.3

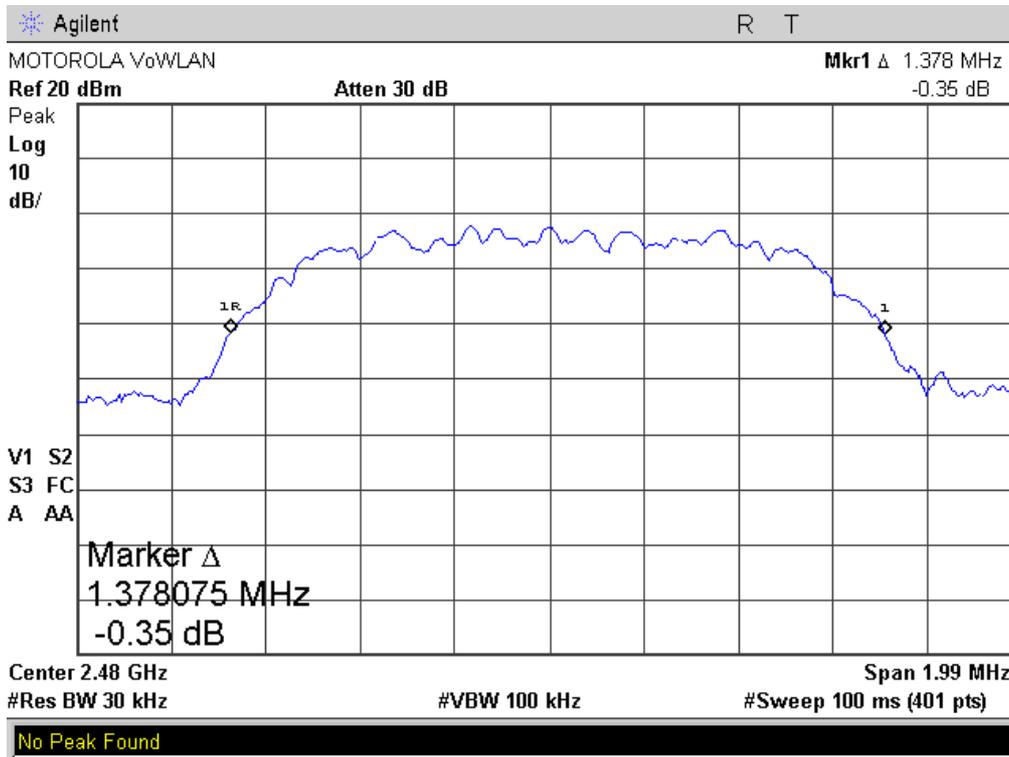
Plot 4.1.1



Plot 4.1.2



Plot 4.1.3



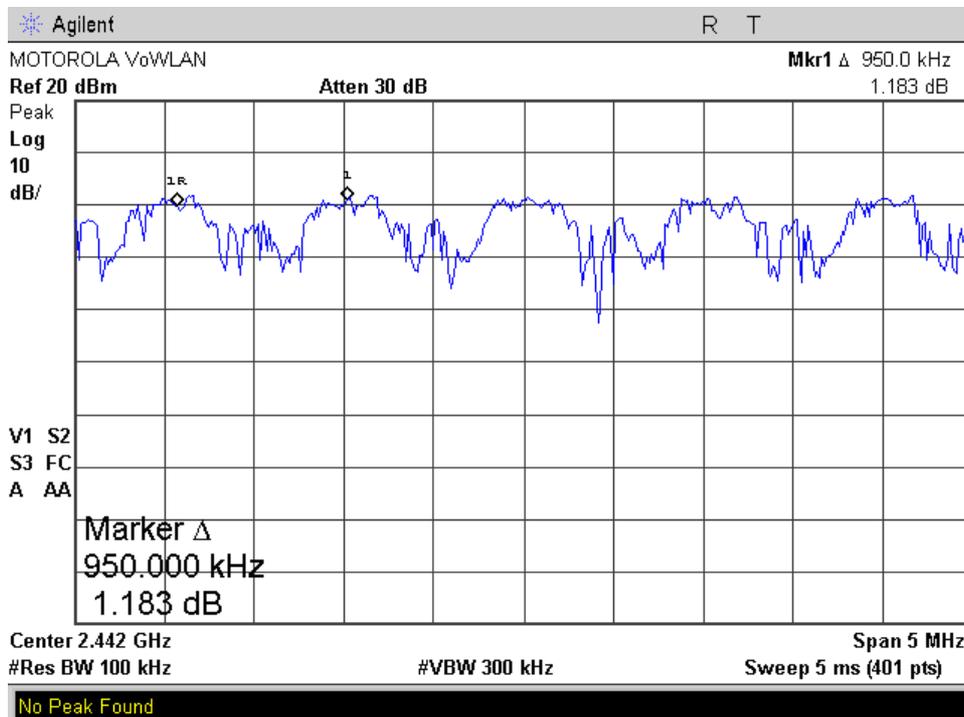
4.2. Carrier Frequency Separation

Reference document:	47 CFR §15.247 (a) (1) & DA 00-705		
Test Requirements:	In the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by a minimum of 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.		
Test setup:	See Sec. 2.1	Pass	
Operating conditions:	Under normal test conditions		
Method of testing:	Conducted		
S.A. Settings:	RBW: 100kHz, VBW: 100kHz		
Hopping function:	Enabled		
Environment conditions:	Ambient Temperature: 22°C	Relative Humidity: 48%	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	See Plot 4.2	

Test results:

20dB BW [kHz]	Carrier separation [kHz]	Result
1388	950	Pass

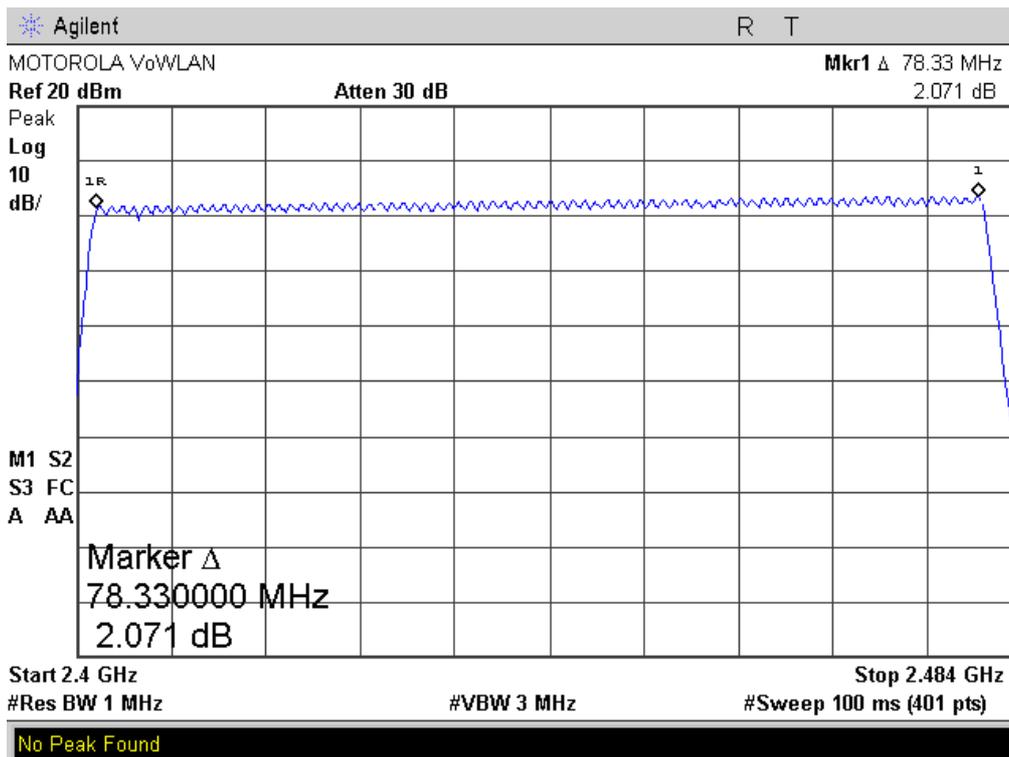
Plot 4.2



4.3. Number of Hopping Channels

Reference document:	47 CFR §15.247 (a) (1)(iii) & DA 00-705		
Test Requirements:	Hopping system shall use at least 15 non-overlapping channels.		
Test setup:	See Sec. 2.1	Pass	
Operating conditions:	Under normal test conditions		
Method of testing:	Conducted		
S.A. Settings:	RBW: 1MHz, VBW: 3MHz		
Hopping function:	Enabled		
Environment conditions:	Ambient Temperature: 22°C	Relative Humidity: 48%	Atmospheric Pressure: 1011.4 hPa
Test Result:	79 hopping channels	See Plot 4.3	

Plot 4.3



4.4. Average Time of Occupancy (Dwell Time)

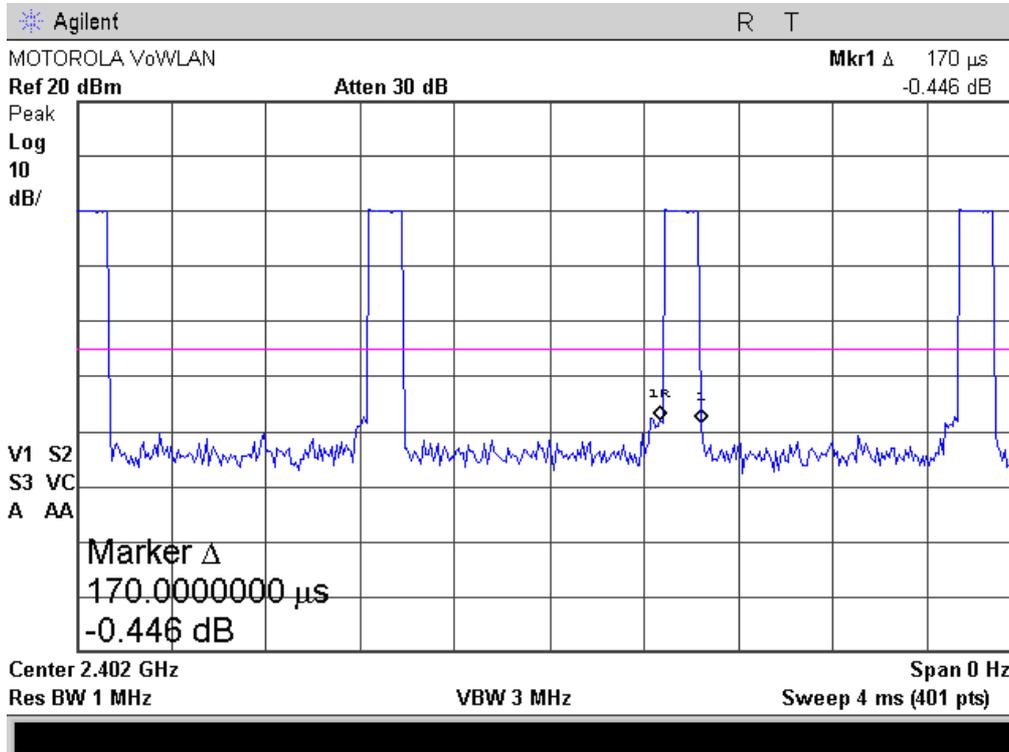
Reference document:	47 CFR §15.247 (a) (1) (iii) & DA 00-705		
Test Requirements:	The average time of occupancy on any channel shall not be greater than 0.4seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.		
Test setup:	See Sec. 2.1	Pass	
Operating conditions:	Under normal test conditions		
Method of testing:	Conducted		
S.A. Settings:	RBW: 1MHz, VBW: 3MHz, Span:0 centered on hopping channel		
Hopping function:	Disabled		
Environment conditions:	Ambient Temperature: 22°c	Relative Humidity: 48%	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	See Plot 4.4.1– Plot 4.4.3	

Test results:

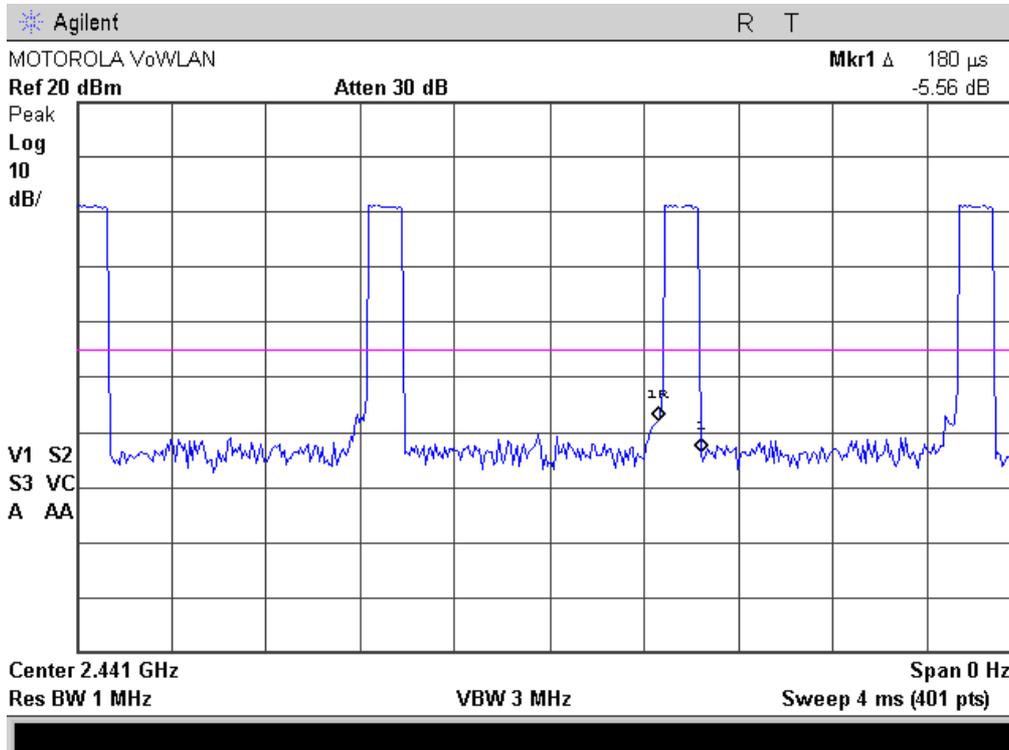
Frequency [GHz]	Time slot length [msec]	Reference Plot	Dwell time [Sec]	Limit [Sec]	Result
2.402	0.17	4.4.1	0.109	0.4	Pass
2.443	0.18	4.4.2	0.115	0.4	Pass
2.480	0.19	4.4.3	0.122	0.4	Pass

Dwell Time = Time Slot Length * Hop Rate/Number of Hopping Channels* Period Time
 Period Time= 0.4sec * 79, Hop Rate =1600 1/s

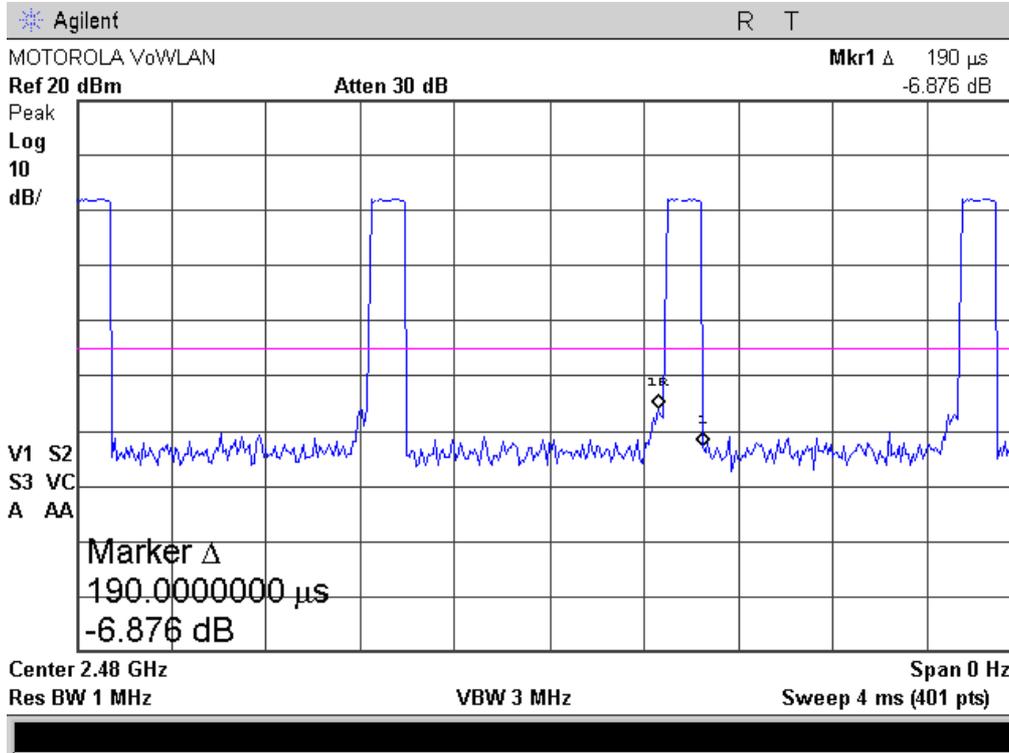
Plot 4.4.1



Plot 4.4.2



Plot 4.4.3



4.5. Maximum Peak Output Power

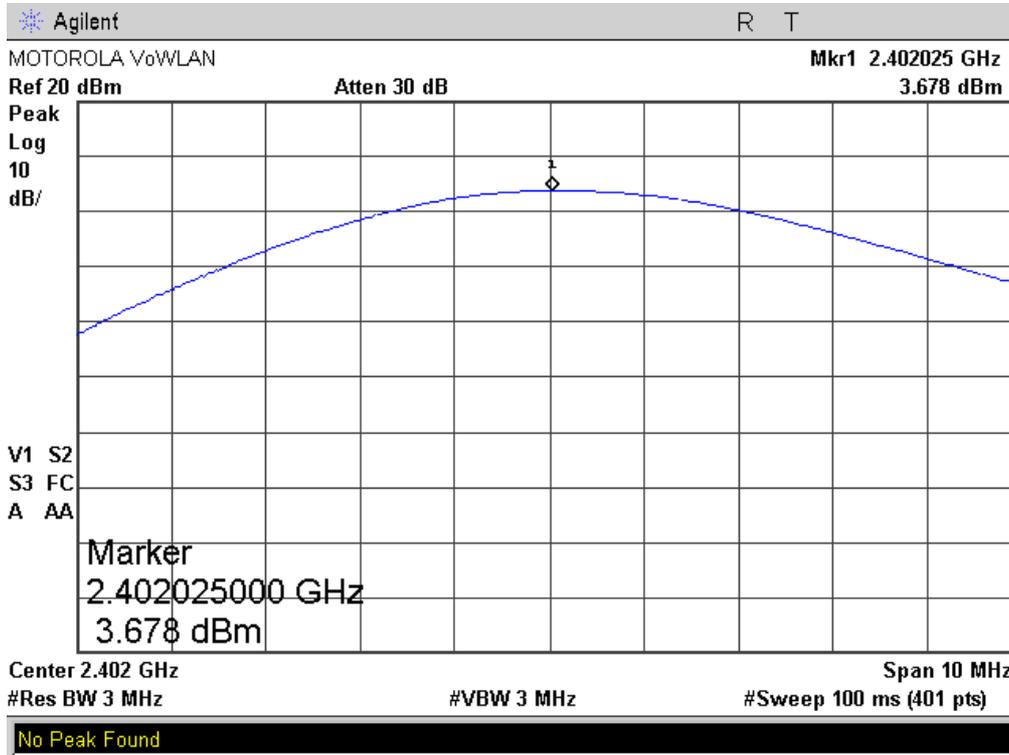
Reference document:	47 CFR §15.247 (b) (1) & DA 00-705		
Test Requirements:	The maximum peak output power shall not exceed 1Watt (30dBm)		
Test setup:	See Sec. 2.1	Pass	
Operating conditions:	Under normal test conditions		
Method of testing:	Conducted		
S.A. Settings:	RBW: 3MHz, VBW: 3MHz,		
Hopping function:	Disabled		
Environment conditions:	Ambient Temperature: 22°C	Relative Humidity: 48%	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	See Plot 4.5.1 – Plot 4.5.3	

Test results:

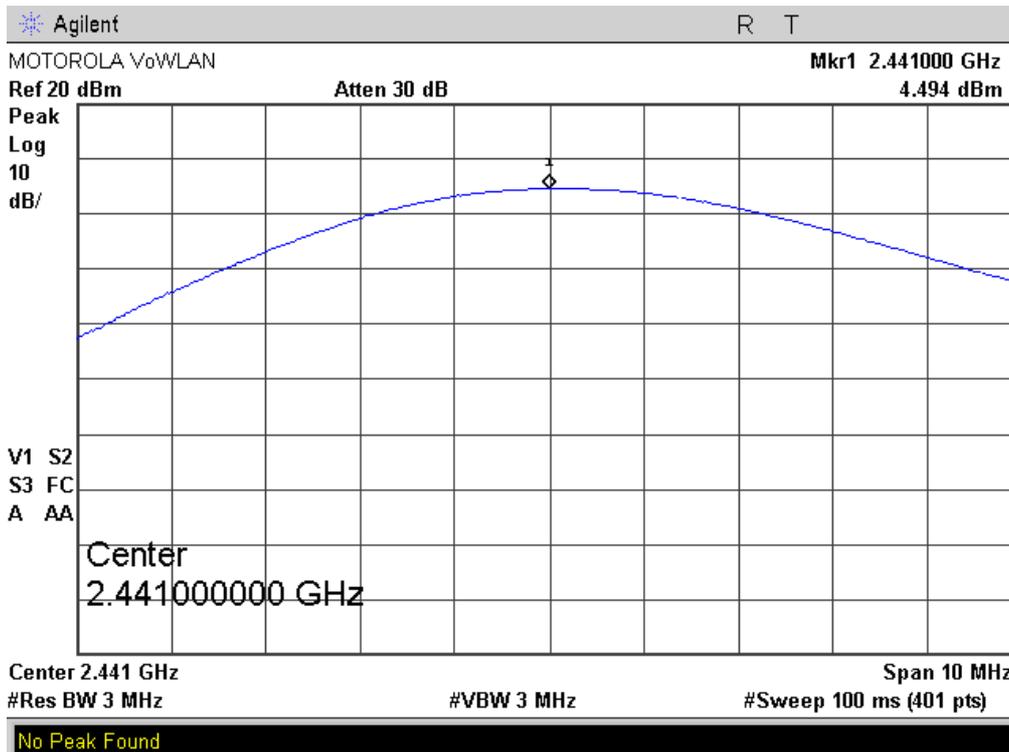
Frequency [GHz]	Cable Loss [dB]	Max. Peak Output power* [dBm]	Max. Peak Output power* [mW]	Reference Plots	Result
2.402	0.45	3.678	2.332	4.5.1	Pass
2.443	0.45	4.494	2.814	4.5.2	Pass
2.480	0.45	4.355	2.726	4.5.3	Pass

*Corrected for external attenuations

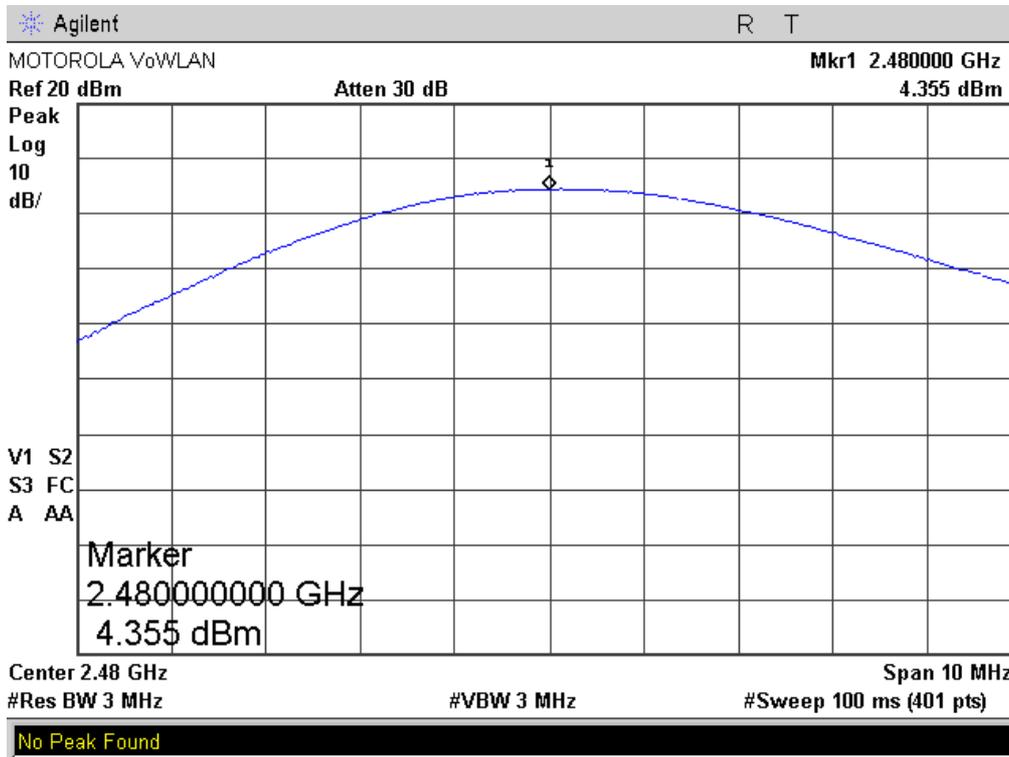
Plot 4.5.1



Plot 4.5.2



Plot 4.5.3



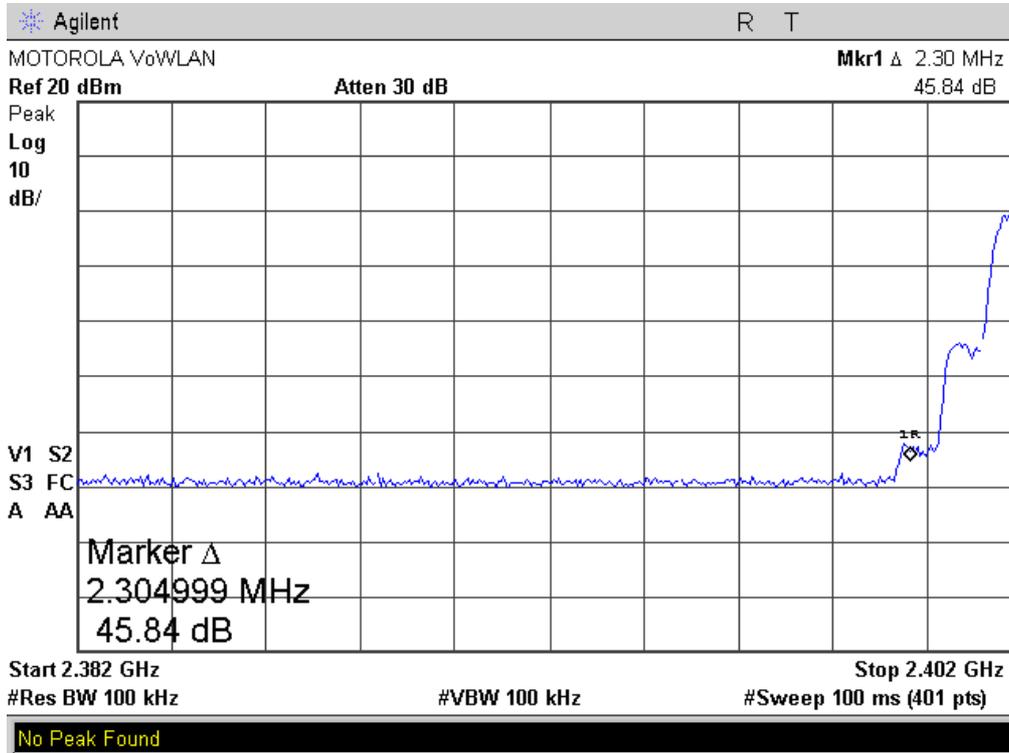
4.6. Band-edge compliance of RF Conducted Emission

Reference document:	47 CFR §15.247 (d) & DA 00-705		
Test Requirements and limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in section 15.209(a) (See section 15.205(c).		
Test setup:	See Sec. 2.1	Pass	
Operating conditions:	Under normal test conditions		
Method of testing:	Conducted		
S.A. Settings:	RBW: 100kHz, VBW: 100kHz		
Hopping function:	Disabled/Enabled		
Environment conditions:	Ambient Temperature: 22°C	Relative Humidity: 48%	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	See Plot 4.6.1 – Plot 4.6.4	

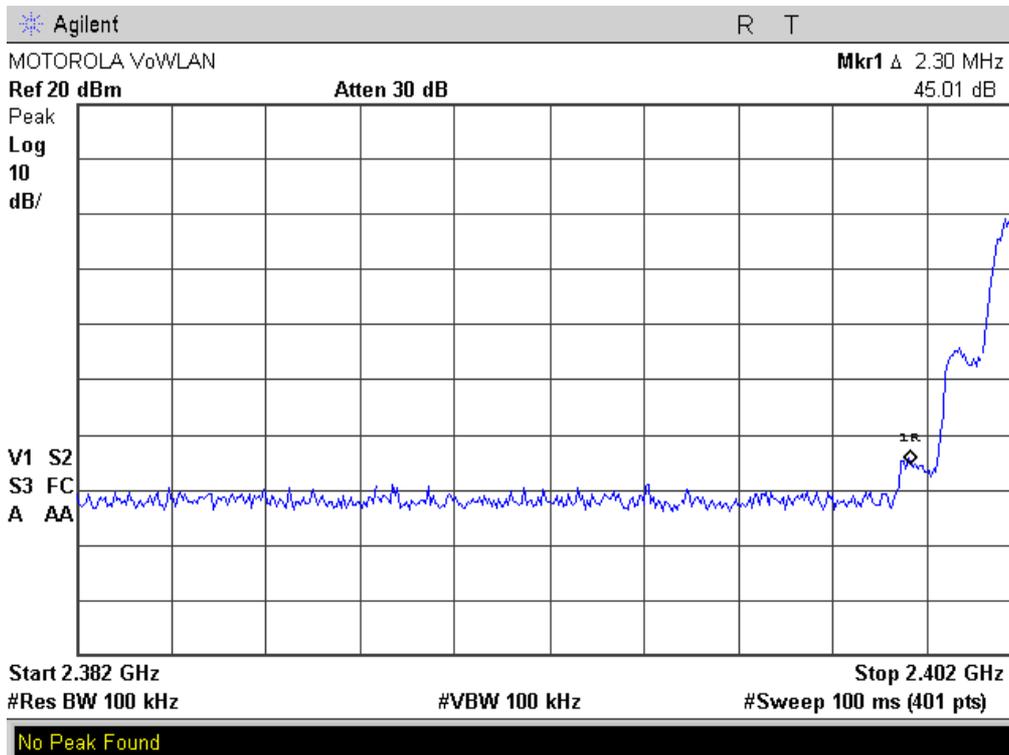
Test results of

Activity	Measured emission [dBc]	Limit [dBc]	Reference Plots	Result
Hopping off, lowest frequency	-45.84	-20	4.6.1	Pass
Hopping on, lowest frequency	-45.01	-20	4.6.2	Pass
Hopping off, highest frequency	-48.56	-20	4.6.3	Pass
Hopping on, highest frequency	-49.13	-20	4.6.4	Pass

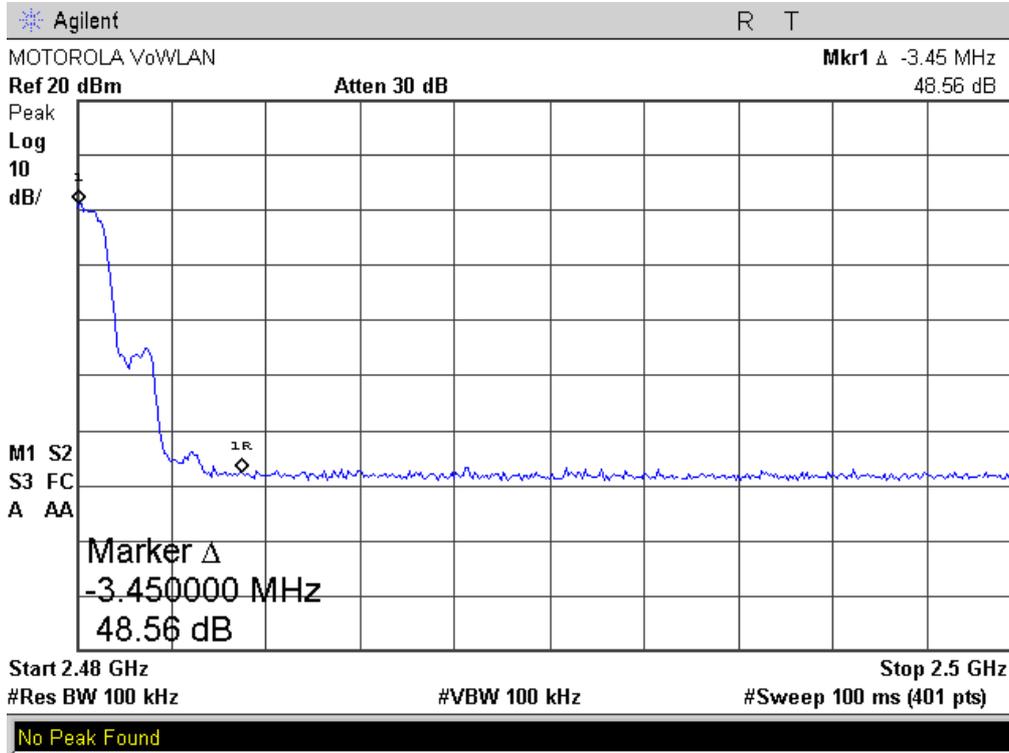
Plot 4.6.1



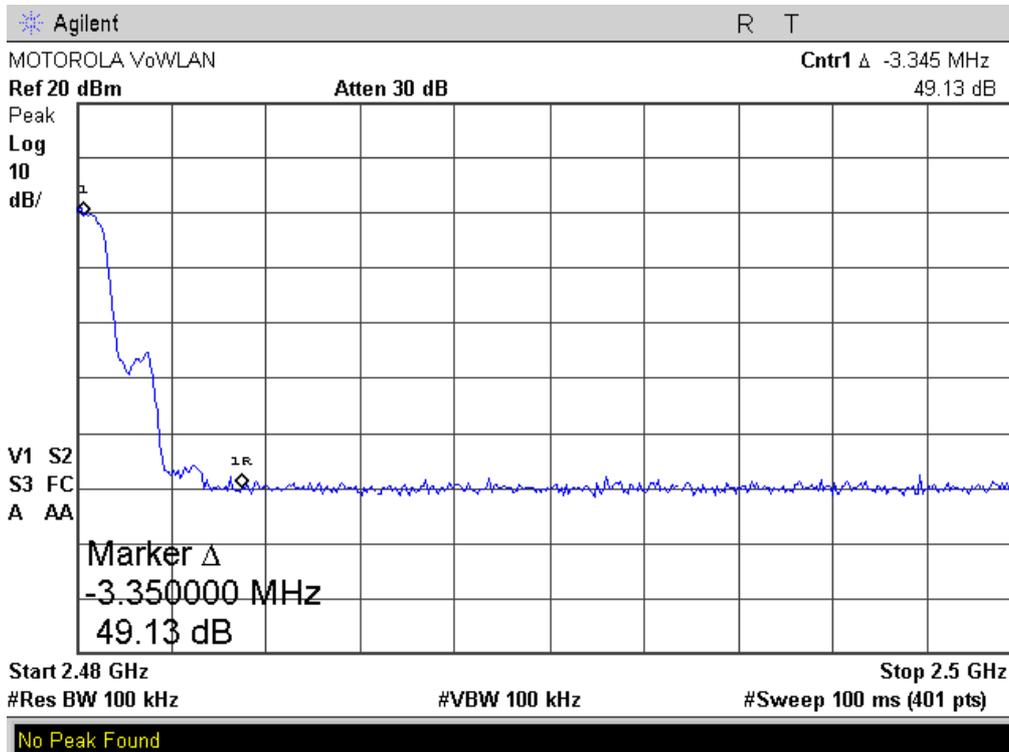
Plot 4.6.2



Plot 4.6.3



Plot 4.6.4



4.7. Radiated Spurious Emissions, Restricted Bands (2310-2390MHz, 2483.5-2500MHz)

Reference document:	47 CFR §15.247 (d) & §15.209(a) & DA 00-705		
Test Requirements:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in section 15.209(a) (See section 15.205(c).		
Test setup:	See Sec. 2.2	Pass	
Operating conditions:	Under normal test conditions		
Method of testing:	Radiated		
S.A. Settings:	RBW: 1MHz, VBW: 3MHz, 10Hz		
Hopping function:	Disabled/Enabled		
Environment conditions:	Ambient Temperature: 22°C	Relative Humidity: 48%	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	See Plot 4.7.1 – Plot 4.7.16	

Test results:

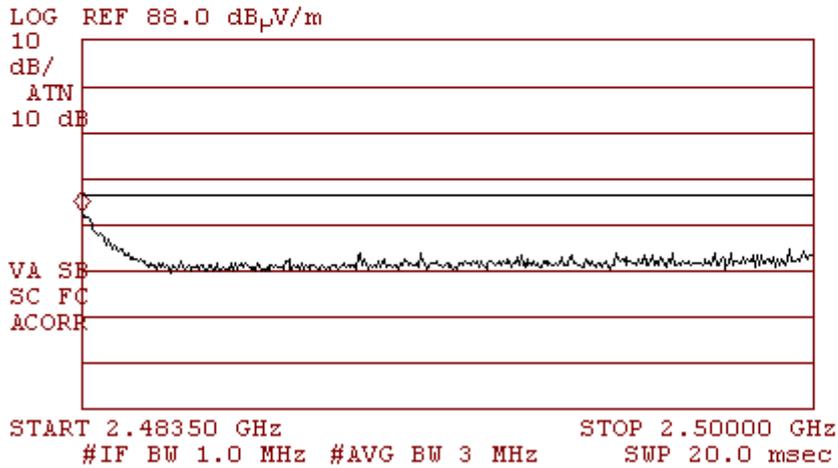
Channel	Detector type	Max. Measured in restricted band at 3m [dBμV/m]	Limit [dBμV/m]	Reference Plots	Result		
Hopping off, highest frequency	Average	45.86	54	4.7.1 – 4.7.8	Pass		
	Peak	53.22	74		Pass		
Hopping on, highest frequency	Average	22.69	54		4.7.9 – 4.7.16	Pass	
	Peak	39.58	74			Pass	
Hopping off, lowest frequency	Average	26.38	54	4.7.9 – 4.7.16		Pass	
	Peak	40.77	74			Pass	
Hopping on, lowest frequency	Average	36.09	54			4.7.9 – 4.7.16	Pass
	Peak	23.10	74				Pass

Note: Radiated Emission [dBμV/m] = measured [dBμV] + Correction-factor [dB(1/m)]
Correction Factor = Antenna factor + Cable Loss

**Single mode Highest Frequency
Vertical Polarization
Peak
Plot 4.7.1**

~~/~~ MOTOROLA VoWLAN

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 2.48350 GHz
50.47 dB μ V/m



**Average
Plot 4.7.2**

~~/~~ MOTOROLA VoWLAN

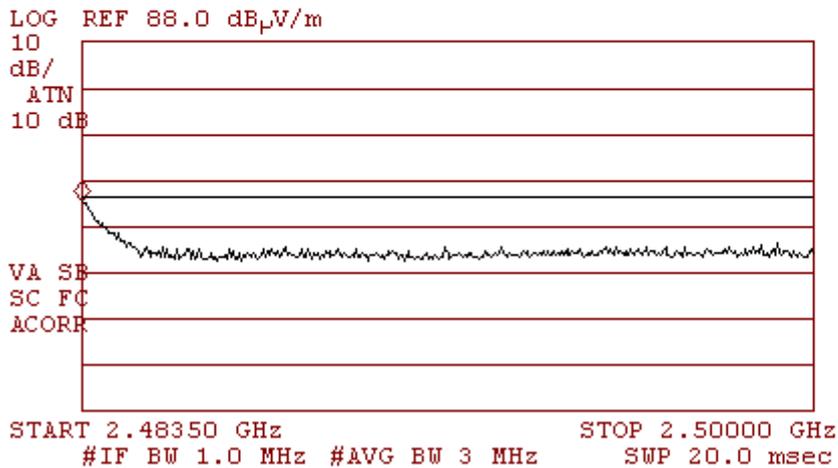
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 2.48350 GHz
42.36 dB μ V/m



**Single mode Highest Frequency
Horizontal Polarization
Peak
Plot 4.7.3**

MOTOROLA VoWLAN

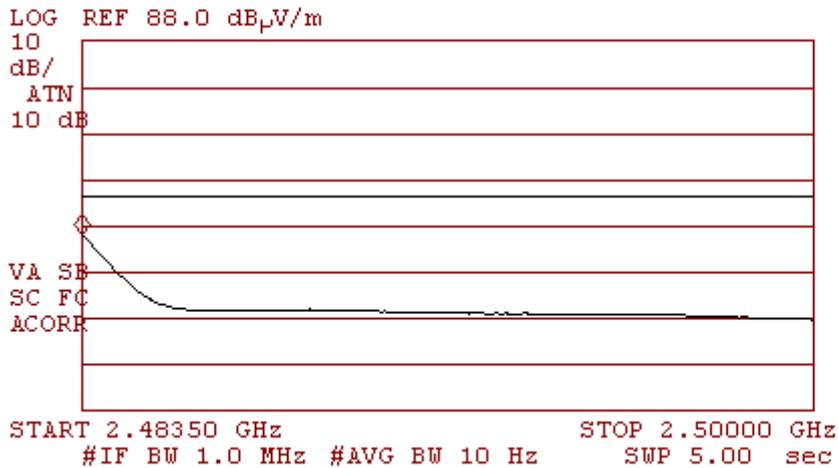
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 2.48350 GHz
53.22 dB μ V/m



**Average
Plot 4.7.4**

MOTOROLA VoWLAN

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 2.48350 GHz
45.86 dB μ V/m

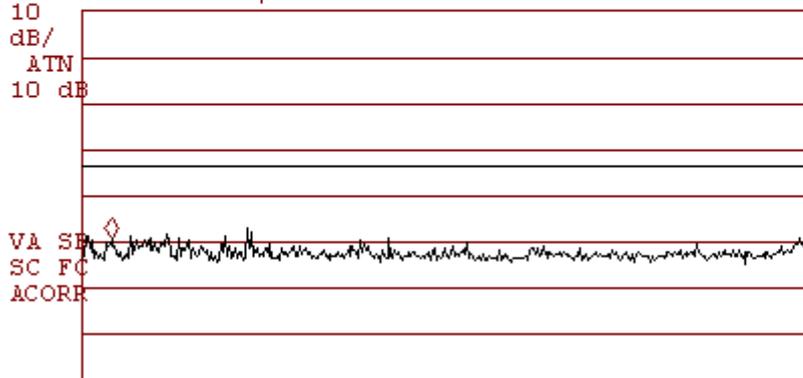


**Hopping mode highest Frequency
Vertical Polarization
Peak
Plot 4.7.5**

~~/~~ MOTOROLA VoWLAN

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 2.48416 GHz
38.47 dB μ V/m

LOG REF 88.0 dB μ V/m



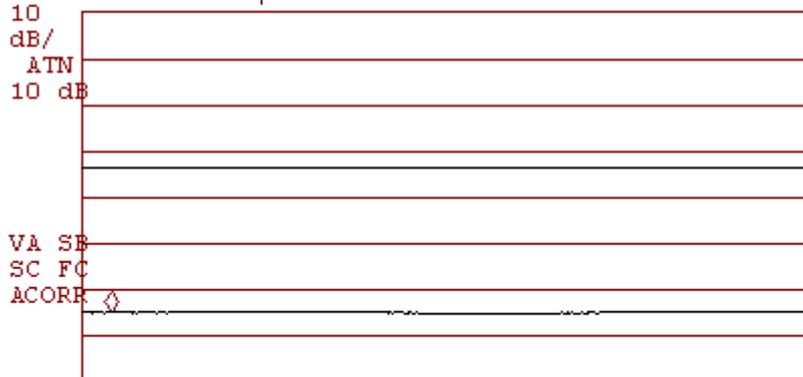
START 2.48350 GHz STOP 2.50000 GHz
#IF BW 1.0 MHz #AVG BW 3 MHz SWP 20.0 msec

**Average
Plot 4.7.6**

~~/~~ MOTOROLA VoWLAN

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 2.48416 GHz
22.86 dB μ V/m

LOG REF 88.0 dB μ V/m



START 2.48350 GHz STOP 2.50000 GHz
#IF BW 1.0 MHz #AVG BW 10 Hz SWP 5.00 sec

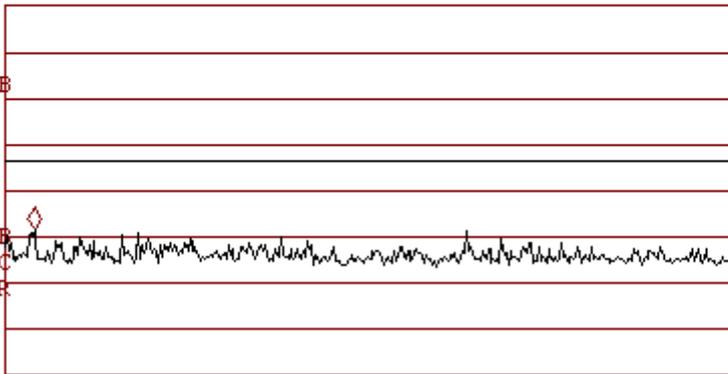
**Hopping mode highest Frequency
Horizontal Polarization
Peak
Plot 4.7.7**

/30 MOTOROLA VoWLAN

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 2.48416 GHz
39.58 dB μ V/m

LOG REF 88.0 dB μ V/m
10
dB/
ATN
10 dB

MA SE
SC FC
ACORR



START 2.48350 GHz STOP 2.50000 GHz
#IF BW 1.0 MHz AVG BW 300 kHz SWP 20.0 msec

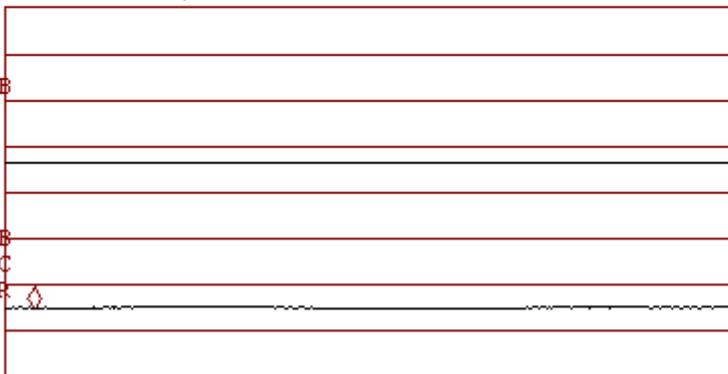
**Average
Plot 4.7.8**

/30 MOTOROLA VoWLAN

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 2.48416 GHz
22.69 dB μ V/m

LOG REF 88.0 dB μ V/m
10
dB/
ATN
10 dB

VA SE
SC FC
ACORR



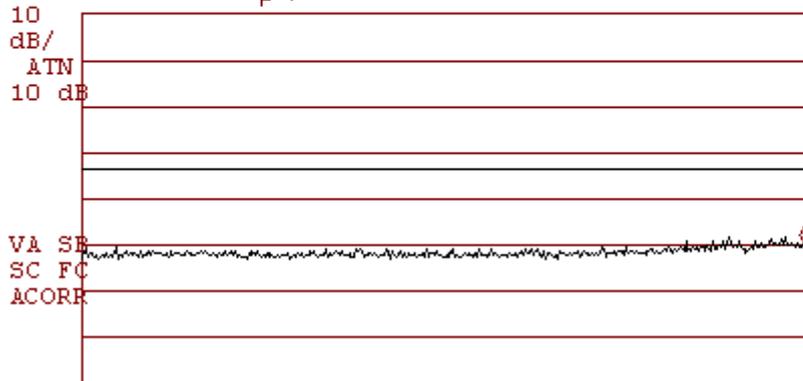
START 2.48350 GHz STOP 2.50000 GHz
#IF BW 1.0 MHz #AVG BW 10 Hz SWP 5.00 sec

**Single mode Lowest Frequency
Vertical Polarization
Peak
Plot 4.7.9**

~~/~~ MOTOROLA VoWLAN

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 2.38910 GHz
37.68 dB μ V/m

LOG REF 88.0 dB μ V/m



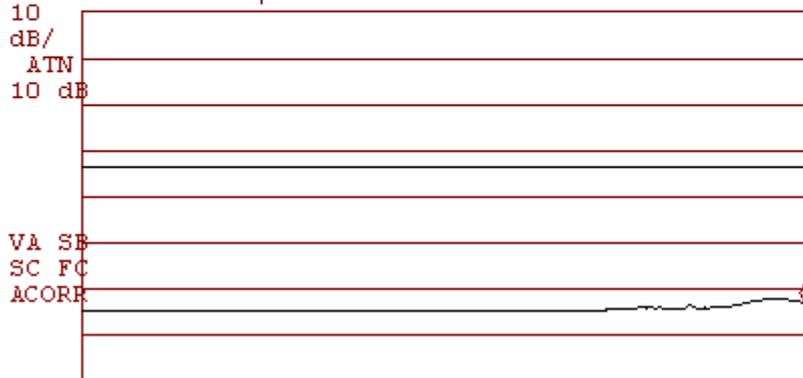
START 2.30000 GHz STOP 2.39000 GHz
#IF BW 1.0 MHz #AVG BW 3 MHz SWP 20.0 msec

**Average
Plot 4.7.10**

~~/~~ MOTOROLA VoWLAN

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 2.38910 GHz
24.58 dB μ V/m

LOG REF 88.0 dB μ V/m



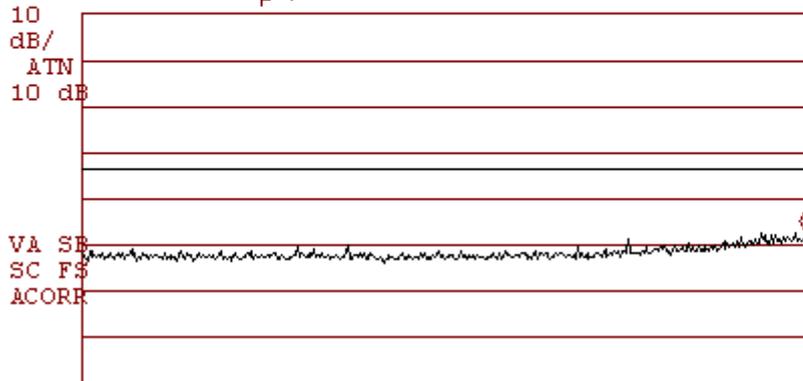
START 2.30000 GHz STOP 2.39000 GHz
#IF BW 1.0 MHz #AVG BW 10 Hz SWP 27.0 sec

**Single mode Lowest Frequency
Horizontal Polarization
Peak
Plot 4.7.11**

MOTOROLA VoWLAN

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 2.38910 GHz
40.77 dB μ V/m

LOG REF 88.0 dB μ V/m



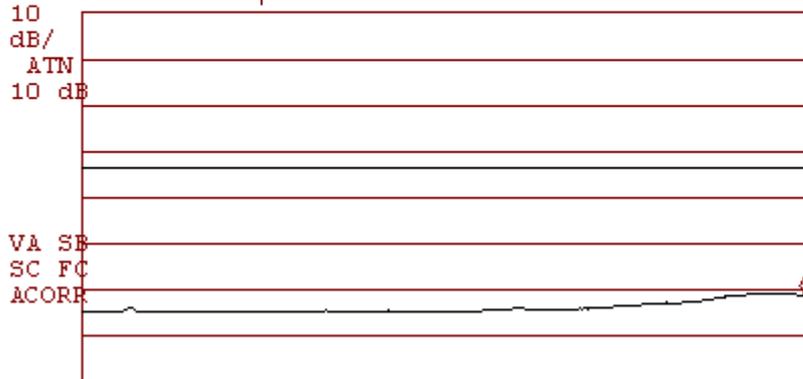
START 2.30000 GHz STOP 2.39000 GHz
#IF BW 1.0 MHz #AVG BW 3 MHz SWP 20.0 msec

**Average
Plot 4.7.12**

MOTOROLA VoWLAN

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 2.38910 GHz
26.38 dB μ V/m

LOG REF 88.0 dB μ V/m



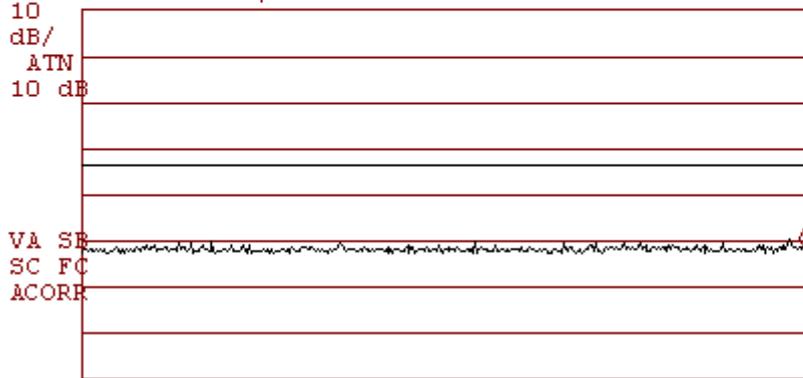
START 2.30000 GHz STOP 2.39000 GHz
#IF BW 1.0 MHz #AVG BW 10 Hz SWP 27.0 sec

**Hopping mode Lowest Frequency
Vertical Polarization
Peak
Plot 4.7.13**

MOTOROLA VoWLAN

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 2.38910 GHz
36.09 dB μ V/m

LOG REF 88.0 dB μ V/m



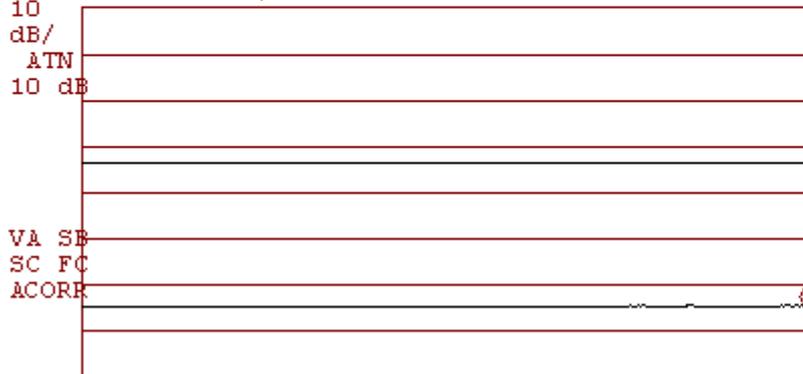
START 2.30000 GHz STOP 2.39000 GHz
#IF BW 1.0 MHz #AVG BW 3 MHz SWP 20.0 msec

**Average
Plot 4.7.14**

MOTOROLA VoWLAN

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 2.38910 GHz
23.10 dB μ V/m

LOG REF 88.0 dB μ V/m



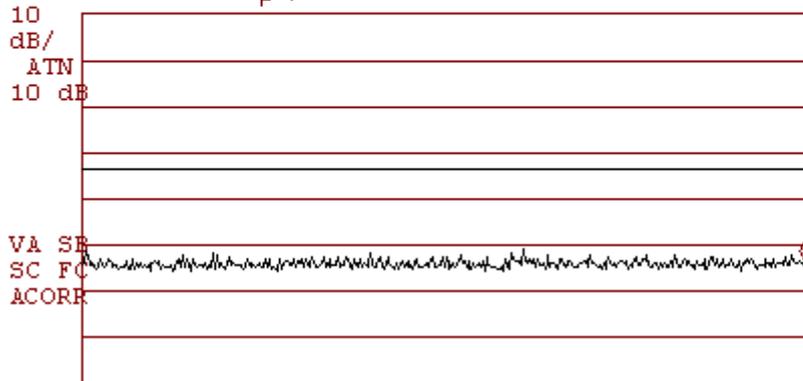
START 2.30000 GHz STOP 2.39000 GHz
#IF BW 1.0 MHz #AVG BW 10 Hz SWP 27.0 sec

**Hopping mode Lowest Frequency
Horizontal Polarization
Peak
Plot 4.7.15**

MOTOROLA VoWLAN

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 2.38910 GHz
34.28 dB μ V/m

LOG REF 88.0 dB μ V/m



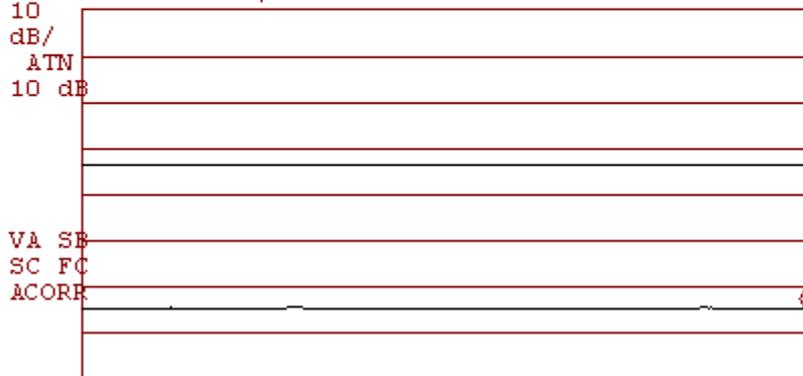
START 2.30000 GHz STOP 2.39000 GHz
#IF BW 1.0 MHz #AVG BW 3 MHz SWP 20.0 msec

**Average
Plot 4.7.16**

MOTOROLA VoWLAN

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 2.38910 GHz
23.08 dB μ V/m

LOG REF 88.0 dB μ V/m



START 2.30000 GHz STOP 2.39000 GHz
#IF BW 1.0 MHz #AVG BW 10 Hz SWP 27.0 sec

4.8. Radiated Spurious Emissions, Restricted Bands

Reference document:	47 CFR §15.247 (d) & §15.209(a) & DA 00-705		
Test Requirements:	The emissions from an intentional radiator shall not exceed the field strength levels specified in §15.209(a).		
Test setup:	See Sec. 2.2	Pass	
Operating conditions:	Under normal test conditions		
Method of testing:	Radiated		
S.A. Settings:	f >1GHz: Peak: RBW= 1MHz, VBW= 3MHz, Average: VBW= 10 Hz f <1GHz: RBW: 120kHz, VBW: 1MHz		
Hopping function:	Disabled (lowest, middle, and highest)		
Environment conditions:	Ambient Temperature: 22°C	Relative Humidity: 48%	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	Plots 4.8.1 – Plot 4.8.16	

Test result

All measurements were done in horizontal and vertical polarizations; the results show the worst case

Lowest channel, 2.402					
Frequency [MHz]	Detector	Spurious level [dBμV/m]	Limit [dBμV/m]	Reference Plot	Result
1939	Avg	32.20	54	4.8.1	Pass
1939	Peak	38.53	74	4.8.1	Pass

Middle channel, 2.443					
Frequency [MHz]	Detector	Spurious level [dBμV/m]	Limit [dBμV/m]	Reference Plot	Result
1939	Avg	32.8	54	4.8.5	Pass
1939	Peak	39.88	74	4.8.5	Pass

Highest channel, 2.48					
Frequency [MHz]	Detector	Spurious level [dBμV/m]	Limit [dBμV/m]	Reference Plot	Result
1939	Avg	33.40	54	4.8.9	Pass
1939	Peak	40.53	74	4.8.9	Pass

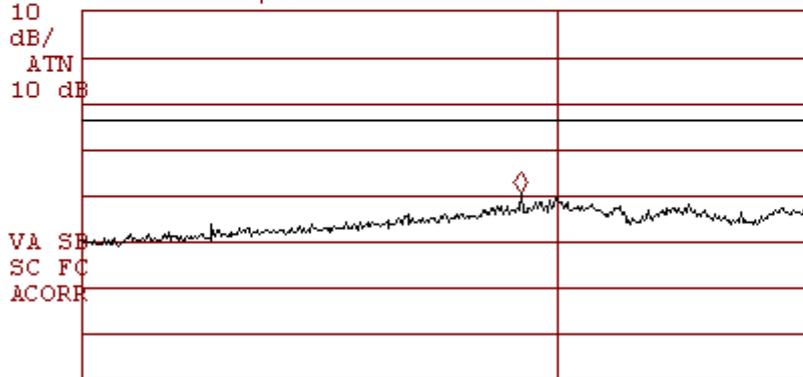
Note: Radiated Emission [dBμV/m] = measured [dBμV] + Correction-factor [dB(1/m)]
Correction Factor = Antenna factor + Cable Loss

**Lowest Frequency
Vertical & Horizontal Polarization
Plot 4.8.1**

MOTOROLA VoWLAN

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 1.939 GHz
38.53 dB μ V/m

LOG REF 78.0 dB μ V/m



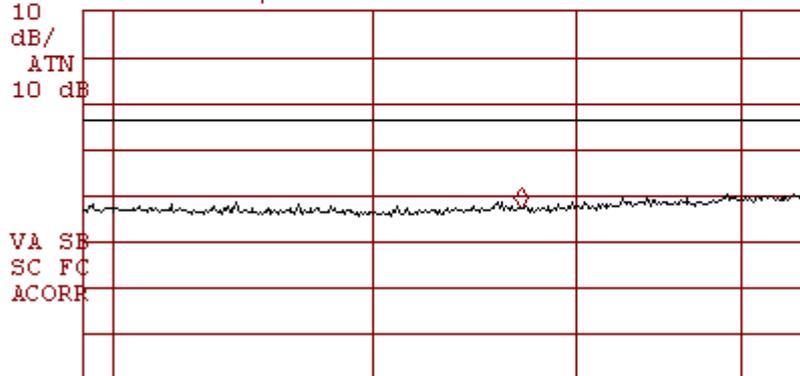
START 1.000 GHz STOP 2.900 GHz
#IF BW 1.0 MHz #AVG BW 3 MHz SWP 43.9 msec

Plot 4.8.2

MOTOROLA VoWLAN

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 4.768 GHz
35.10 dB μ V/m

LOG REF 78.0 dB μ V/m

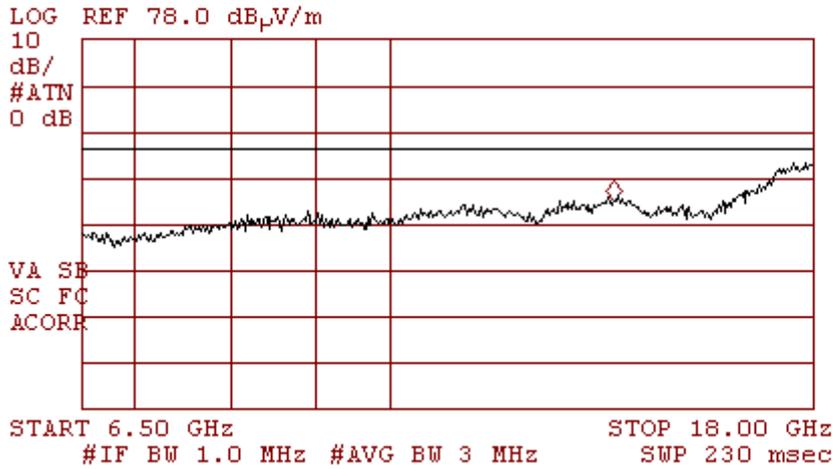


START 2.900 GHz STOP 6.500 GHz
#IF BW 1.0 MHz #AVG BW 3 MHz SWP 72.0 msec

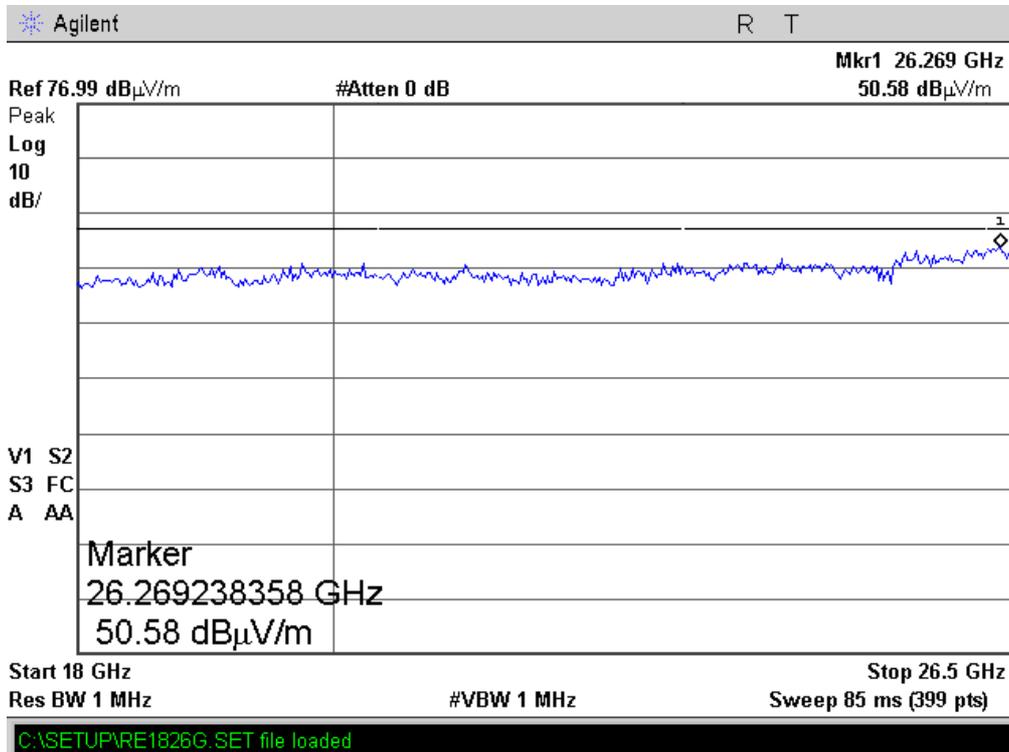
Plot 4.8.3

MOTOROLA VoWLAN

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 14.08 GHz
42.79 dB μ V/m



Plot 4.8.4

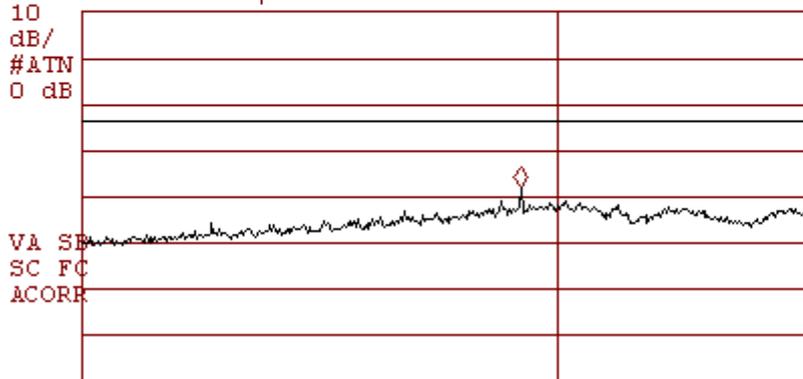


**Middle Frequency
Vertical & Horizontal Polarization
Plot 4.8.5**

MOTOROLA VoWLAN

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 1.939 GHz
39.88 dB μ V/m

LOG REF 78.0 dB μ V/m



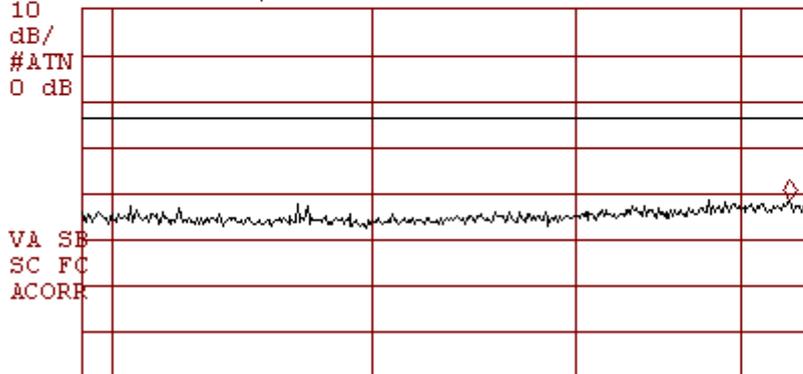
START 1.000 GHz STOP 2.900 GHz
#IF BW 1.0 MHz #AVG BW 3 MHz SWP 43.9 msec

Plot 4.8.6

MOTOROLA VoWLAN

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 6.359 GHz
36.20 dB μ V/m

LOG REF 78.0 dB μ V/m



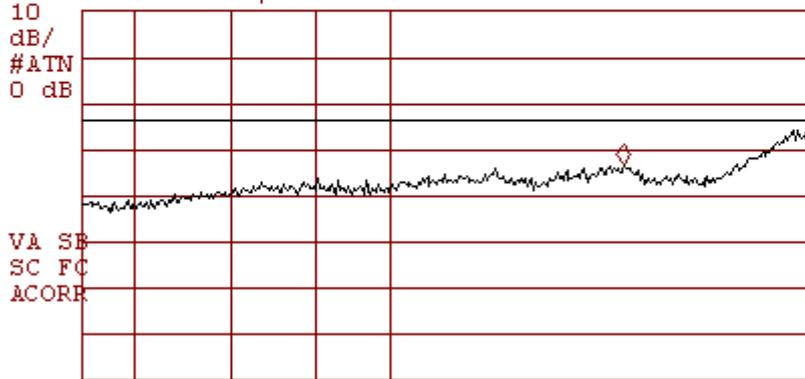
START 2.900 GHz STOP 6.500 GHz
#IF BW 1.0 MHz #AVG BW 3 MHz SWP 72.0 msec

Plot 4.8.7

MOTOROLA VoWLAN

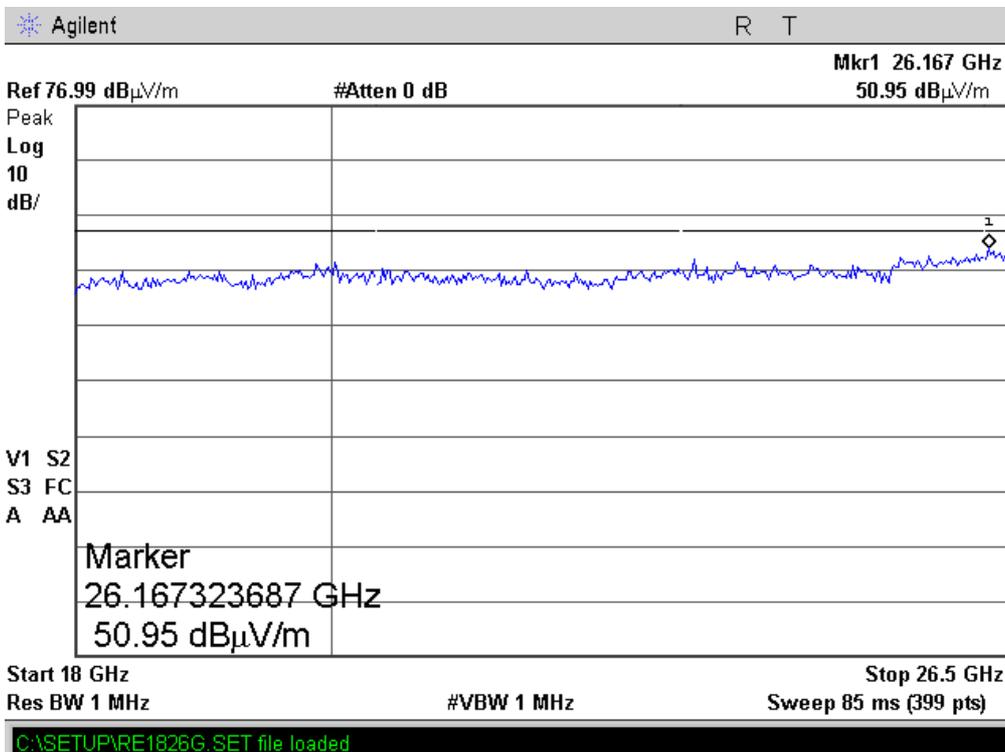
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 14.26 GHz
44.39 dB μ V/m

LOG REF 78.0 dB μ V/m



START 6.50 GHz STOP 18.00 GHz
#IF BW 1.0 MHz #AVG BW 3 MHz SWP 230 msec

Plot 4.8.8

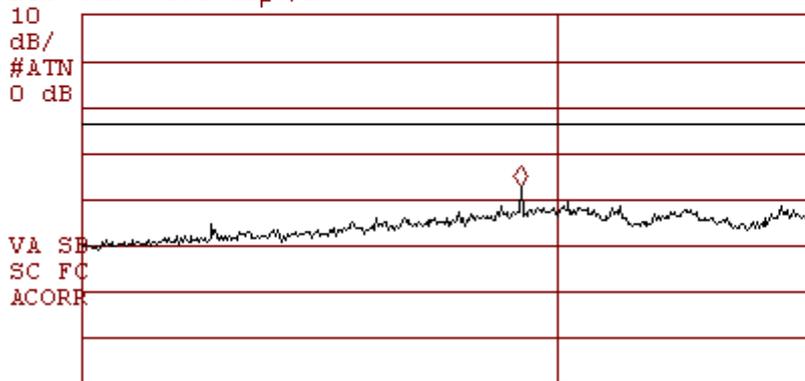


**Highest Frequency
Vertical & Horizontal Polarization
Plot 4.8.9**

MOTOROLA VoWLAN

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 1.939 GHz
40.53 dB μ V/m

LOG REF 78.0 dB μ V/m



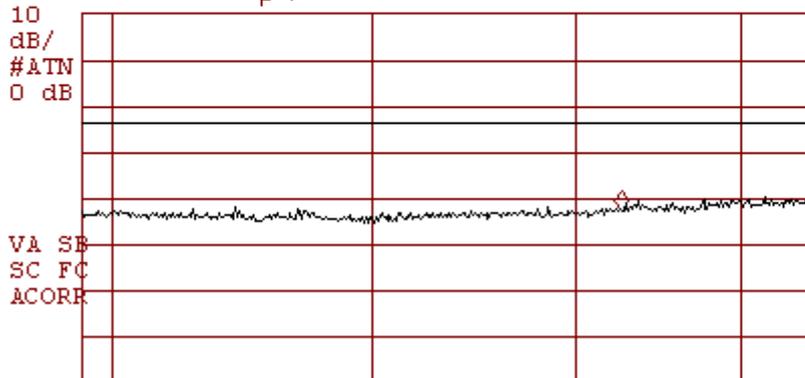
START 1.000 GHz STOP 2.900 GHz
#IF BW 1.0 MHz #AVG BW 3 MHz SWP 43.9 msec

Plot 4.8.10

MOTOROLA VoWLAN

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 5.363 GHz
35.07 dB μ V/m

LOG REF 78.0 dB μ V/m



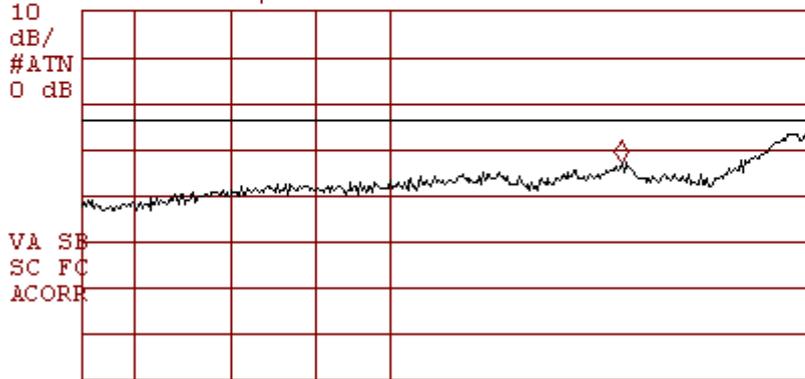
START 2.900 GHz STOP 6.500 GHz
#IF BW 1.0 MHz #AVG BW 3 MHz SWP 72.0 msec

Plot 4.8.11

MOTOROLA VoWLAN

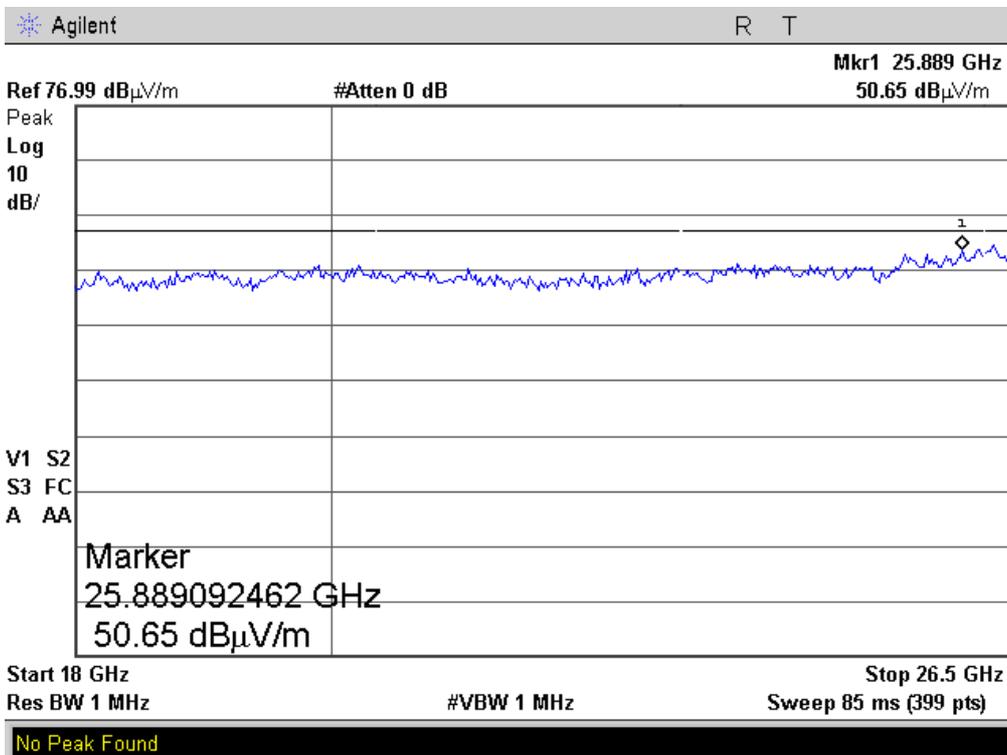
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 14.23 GHz
45.17 dB μ V/m

LOG REF 78.0 dB μ V/m



START 6.50 GHz STOP 18.00 GHz
#IF BW 1.0 MHz #AVG BW 3 MHz SWP 230 msec

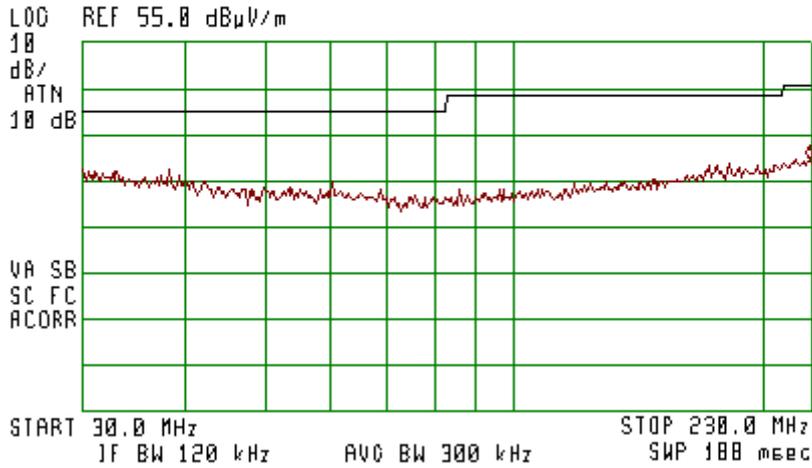
Plot 4.8.12



**Below 1 GHz Worst case for all channels Radiated Emission
Vertical Polarization
Plot 4.8.13**



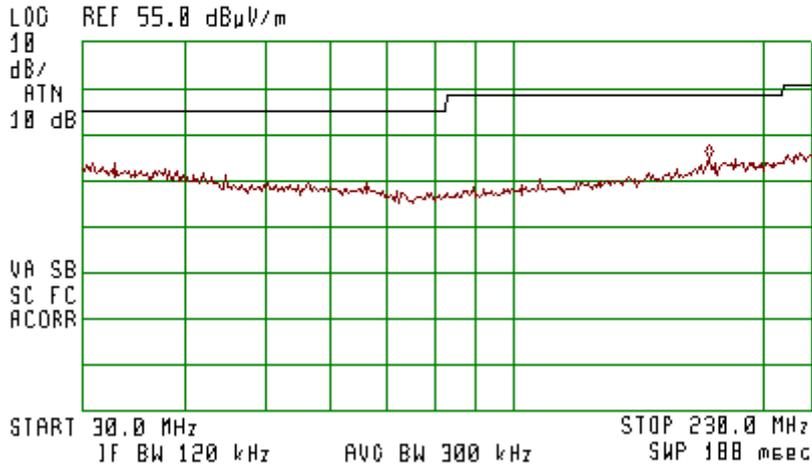
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 228.3 MHz
29.70 dB μ V/m



**Horizontal Polarization
Plot 4.8.14**



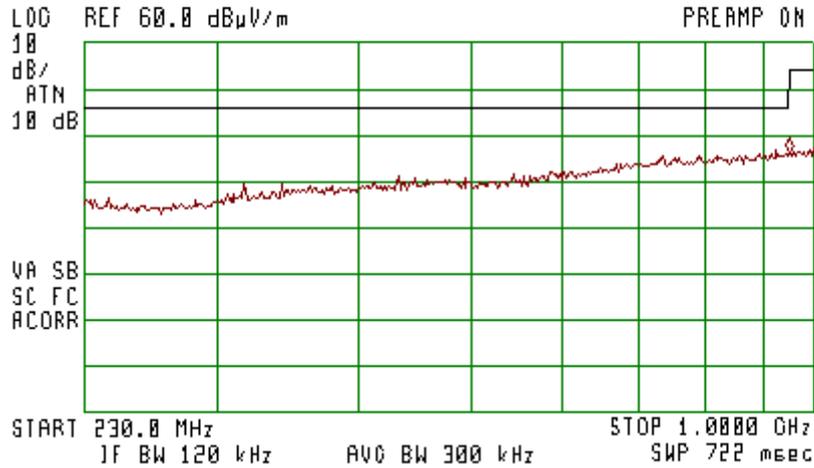
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 181.4 MHz
29.83 dB μ V/m



Horizontal Polarization
Plot 4.8.15



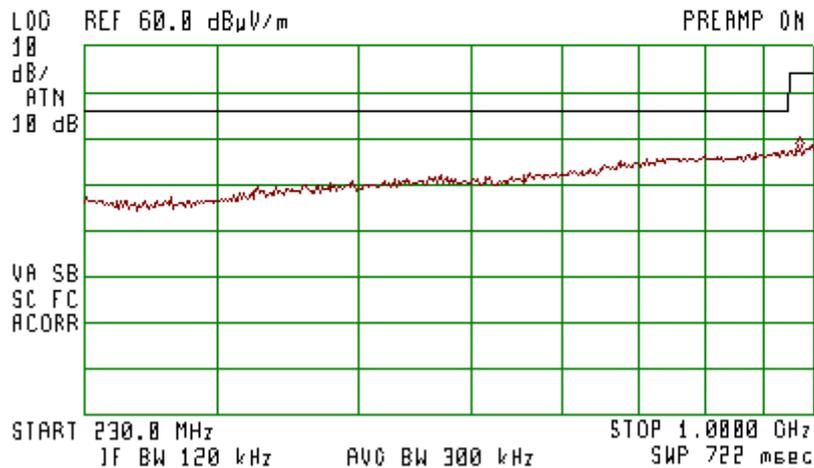
ACTV DET: PEAK
MERS DET: PEAK QP AVG
Mkr 959.2 MHz
36.35 dB μ V/m



Vertical Polarization
Plot 4.8.16



ACTV DET: PEAK
MERS DET: PEAK QP AVG
Mkr 976.7 MHz
37.33 dB μ V/m



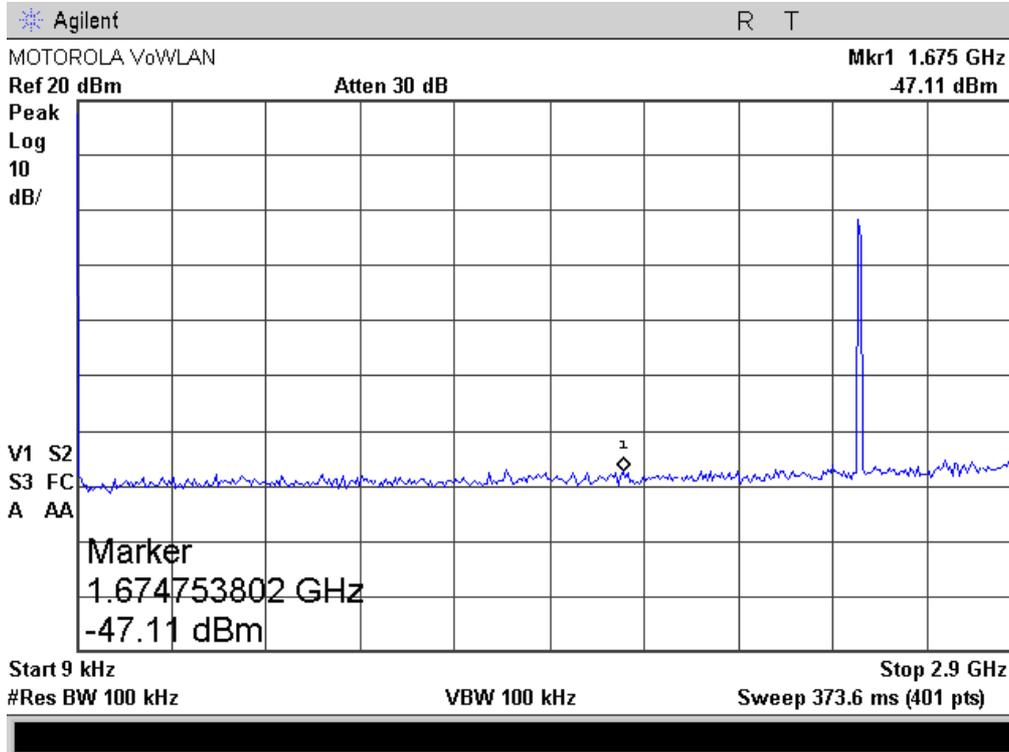
4.9. Spurious Emission- Conducted

Reference document:	47 CFR §15.247 (d) & DA 00-705		
Test Requirements:	In any 100 kHz bandwidth outside the frequency band at least 20 dB below the highest level of the desired power.		
Test setup:	See Sec. 2.1	Pass	
Operating conditions:	Under normal test conditions		
Method of testing:	Conducted		
S.A. Settings:	RBW: 100kHz, VBW: 100kHz,		
Hopping function:	Disabled (lowest, middle, and highest)		
Environment conditions:	Ambient Temperature: 22°c	Relative Humidity: 48%	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	See Plot 4.9.1 – Plot 4.9.6	

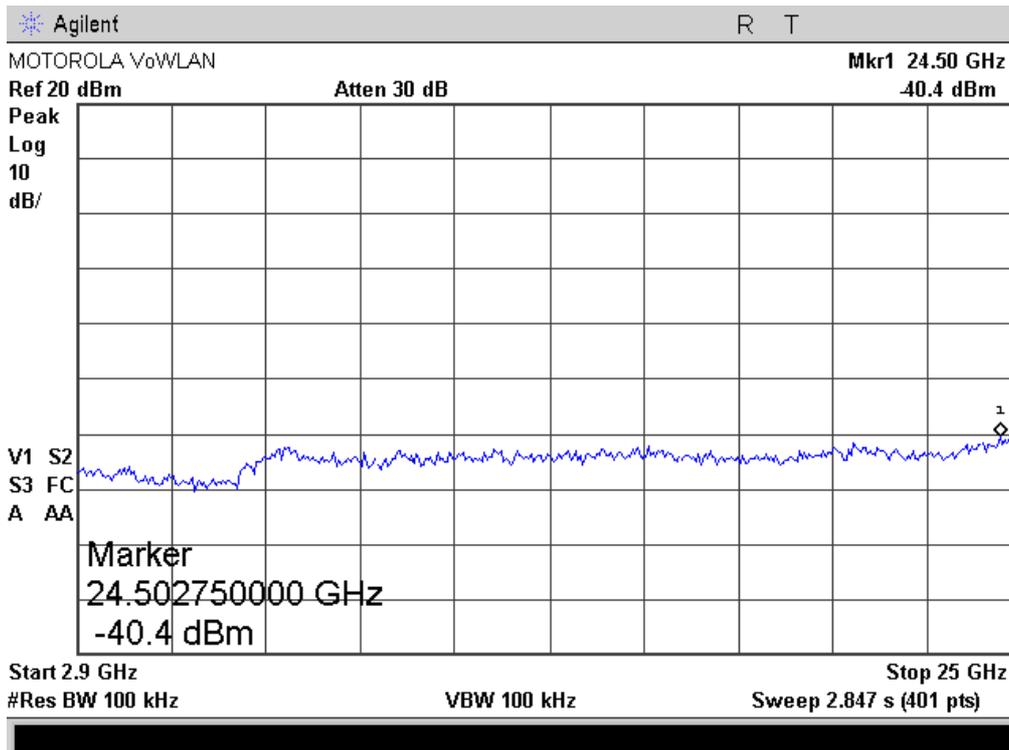
Test results:

Frequency [GHz]	Spurious Frequency [GHz]	Emissions limit	Reference Plots	Result
2.402	All readings At least -40dBc	-20dBc	4.9.1 & 4.9.2	Pass
2.443	All readings At least -40dBc		4.9.3 & 4.9.4	Pass
2.480	All readings At least -40dBc		4.9.5 & 4.9.6	Pass

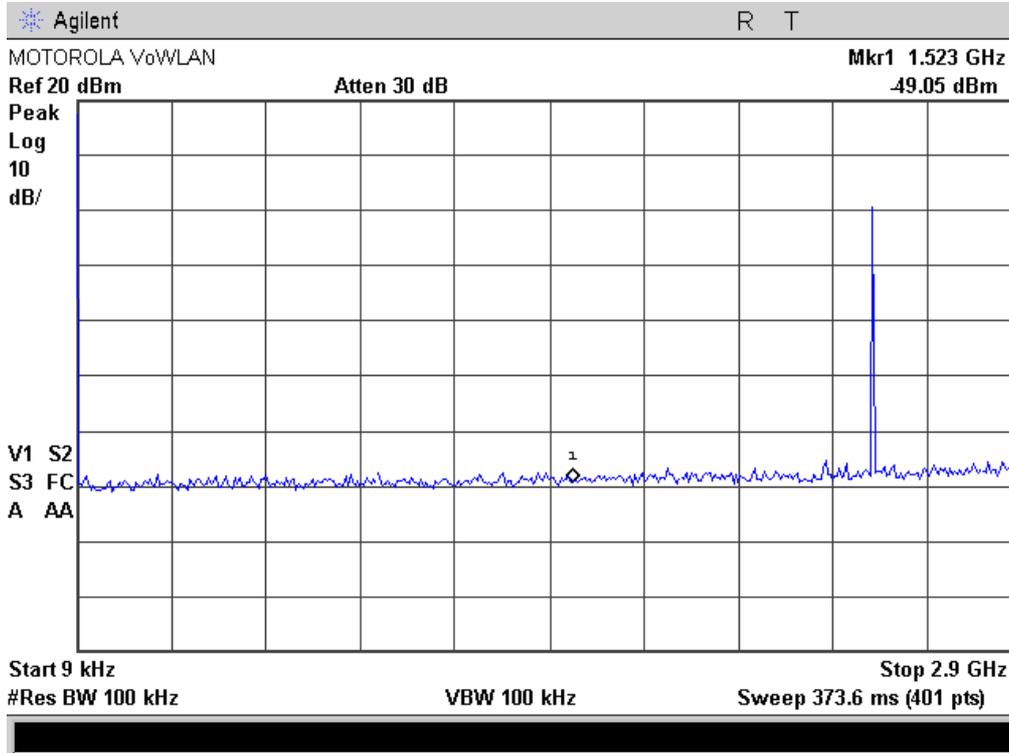
Spurious Emission- Conducted
Low frequency
Plot 4.9.1



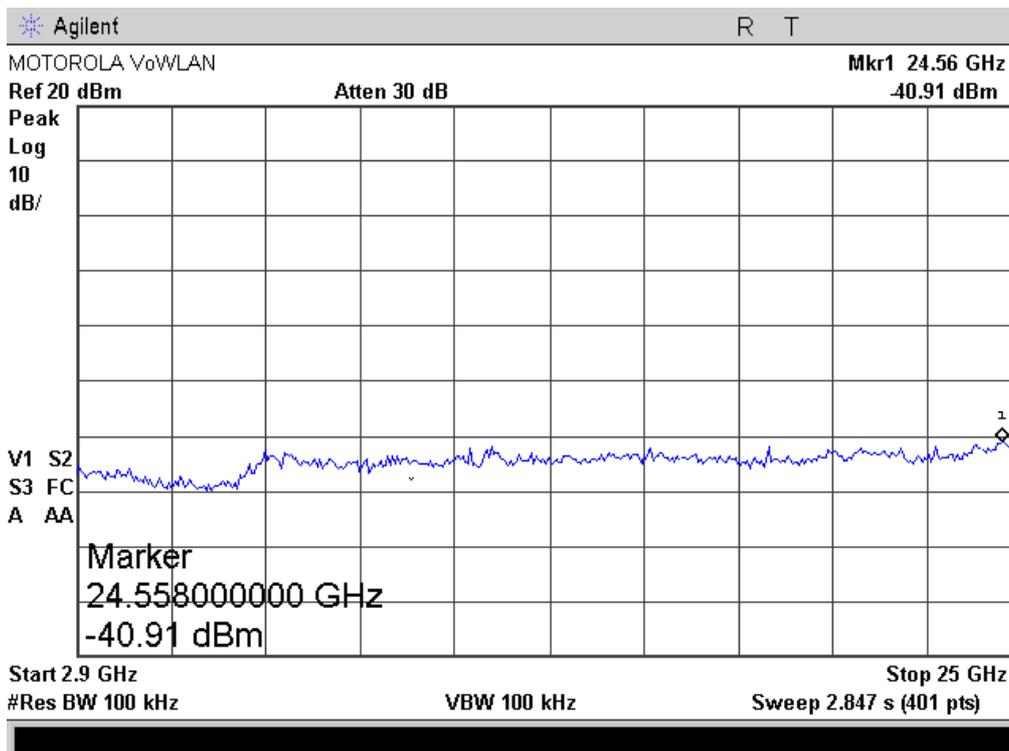
Plot 4.9.2



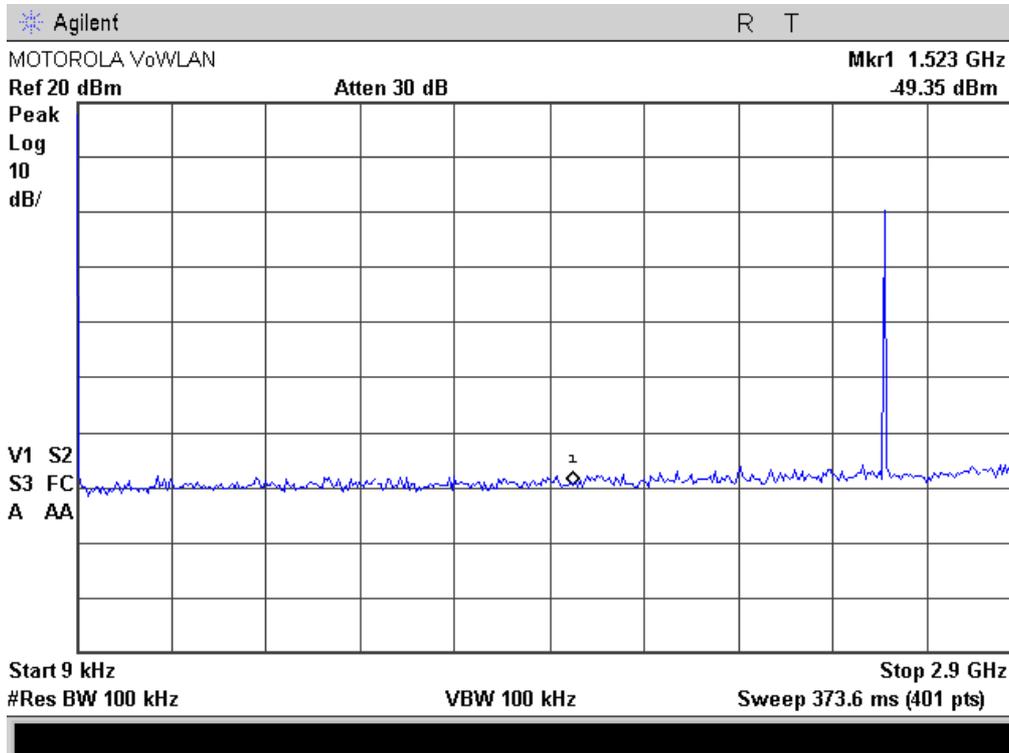
Middle frequency
Plot 4.9.3



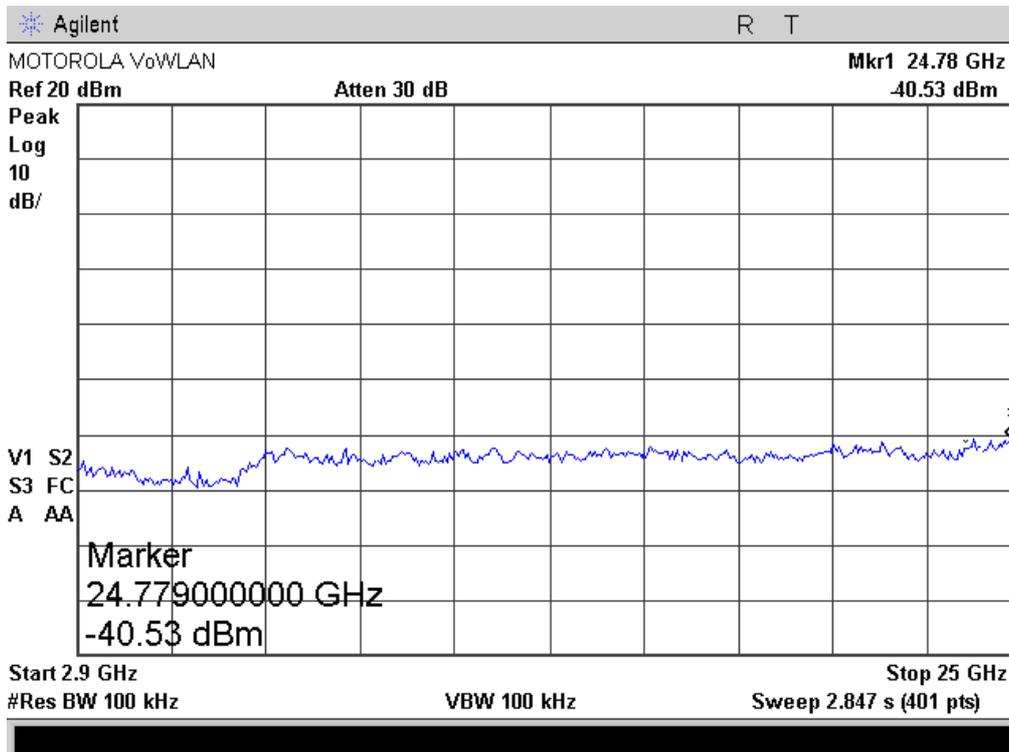
Plot 4.9.4



High frequency
Plot 4.9.5



Plot 4.9.6



4.10. Antenna Connector Requirements

Reference document:	47 CFR §15.203	
Test Requirements:	An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with provisions of this section.	
Test Result:	The VoWLAN employs for Bluetooth an Integral (on board) PIFA single Band.	Pass

5. Appendix

Appendix A: List of Measuring Equipment used:

Equipment	Manufacturer/ Model	Serial Number	Due date
CISPR16 EMI Receiver	HP8546A	3710A00392	30-06-08
Spectrum Analyzer 9kHz ÷ 22 GHz	HP 8593EM	3536A00131	30-06-08
Spectrum Analyzer 100 Hz ÷ 26.5 GHz	Agilent E7405A	US41160436	30-06-08
LNA Amplifier 1 GHz ÷ 18 GHz	AMP – 5D-010180-30-10P-GW	618653	30-06-08
Power meter	Agilent N1911A	MY45100784	23-02-08
Dual Ridged Guide Ant.1-18 GHz	EMCO 3115	9602-4677	30-06-08
Antenna 18 GHz ÷ 26.5 GHz	Alpha Industry 861A/599	505	30-06-08
Turn table	HD100	100/693	-
Antenna Mast	HD 100	100/693	-
Biconical 20 –200 MHz	Schwarzbeck VHBB9124	9124/0255	16-05-08
Log-Periodic 200 – 1000 MHz	Schwarzbeck VUSLP9111	VUSLP9111184	16-05-08
Pre-Amplifier	MiTeq, AMF-5F-18002650-30-10P	945372	30-06-08
LISN	Fischer 50/250-25-2	-	30-06-08
Transient Limiter	HP11947A	-	30-06-08
Notch Filter	Micro-Tronics BRM50702-05	0001	30-06-08

Appendix B: Accreditation Certificate



End of the Test Report