FCC AND IC CERTIFICATION TEST REPORT

FOR

Applicant	:	Harman International Industries, Inc.
Address	:	8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES
Equipment under Test	:	SOUNDBAR
Model No.	:	BAR 9.1 CNTR
Trade Mark	:	JBL
FCC ID	:	APIBAR91CNTR
IC	:	6132A-BAR91CNTR
Manufacturer	:	Harman International Industries, Inc.
Address	:	8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES

Issued By: Dongguan Dongdian Testing Service Co., Ltd.

Add: No. 17, Zongbu Road 2, Songshan Lake Sci&Tech, Industry Park, Dongguan City, Guangdong Province, China, 523808

Tel: +86-0769-38826678, **E-mail:** ddt@dgddt.com, http://www.dgddt.com

REPORT

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TEST REPORT DECLARE

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Manufacturer	:	Harman International Industries, Inc.
Address	:	8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES

Test Standard Used: FCC Rules and Regulations Part 15 Subpart C, RSS-247 Issue 2 February 2017.

Test procedure used: ANSI C63.10:2013, 789033 D02 General U-NII Test Procedures New Rules v02r01, RSS-Gen Issue 5, Apr. 2018

We Declare:

The equipment described above is tested by Dongguan Dongdian Testing Service Co., Ltd and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and Dongguan Dongdian Testing Service Co., Ltd is assumed of full responsibility for the accuracy and completeness of these tests.

After test and evaluation, our opinion is that the equipment provided for test compliance with the requirement of the above FCC&IC standards.

Report No:	DDT-R19080513-1E8		
Date of Receipt:	Sep. 04, 2019	**Date of Test:**	Sep. 04, 2019 ~ Dec. 11, 2019

Prepared By: ***Approved By:***

Sam Li

Sam Li/Engineer ***Damon Hu/EMC Manager***

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Dongguan Dongdian Testing Service Co., Ltd.

Revision history

Rev.	Revisions	Issue Date	Revised By
---	Initial issue	Dec. 11, 2019	

1. Summary of test results

The EUT have been tested according to the applicable standards as referenced below.		
Description of Test Item	**Standard**	**Results**
6/26db Bandwidth and 99% Bandwidth	FCC 15.407 (e) RSS-247 Clause 6.2	PASS
Maximum Conducted Output Power	FCC 15.407 (a) RSS-247 Clause 6.2	PASS
Power Spectral Density	FCC 15.407 (a) RSS-247 Clause 6.2	PASS
Frequency Stability Measurement	FCC 15.407 (g)	PASS
Emissions in restricted frequency bands	FCC 15.407 (a) FCC 15.209 FCC 15.205 RSS-247 Clause 6.2 RSS-GEN Clause 8.9	PASS
Band Edge Compliance	FCC 15.407 (a) FCC 15.209 FCC 15.205 RSS-247 Clause 6.2 RSS-GEN Clause 8.9	PASS
Power Line Conducted Emission	FCC 15.207 RSS-GEN Clause 8.8	PASS
Antenna requirement	FCC 15.203 RSS-GEN Clause 8.3	PASS
Dynamic Frequency Selection	FCC 15.407 (h) RSS-247 Clause 6.3	N/A
Note: N/A is an abbreviation for Not Applicable.		

2. General test information

2.1. Description of EUT

EUT* Name	:	SOUNDBAR
Model Number	:	BAR 9.1 CNTR
EUT function description	:	Please reference user manual of this device
Power supply	:	100-240V~, 50/60Hz
Radio Technology	:	SRD
FCC Operation frequency	:	5180-5240 MHz, 5736-5814 MHz
Modulation	:	QPSK
Antenna Type	:	Antenna A: Integral PCB antenna, maximum PK gain: 3.2 dBi Antenna B: Integral PCB antenna, maximum PK gain: 3.2 dBi
Sample Type	:	Series production

Note 1: EUT is the ab. of equipment under test.
Note 2: The EUT supports the antenna with TX and RX diversity functions.

2.2. Accessories of EUT

Description of Accessories	Manufacturer	Model number	Description	Remark
AC Cable	Harman	N/A	1.5 m long, unshielded, non-magnetic ring	2 pcs
HDMI Cable	Harman	N/A	1.2 m long, unshielded, With two magnetic rings	N/A
Remote control	Harman	N/A	N/A	N/A

2.3. Assistant equipment used for test

Assistant equipment	Manufacturer	Model number	EMC Compliance	SN
Notebook	Lenovo Beijing Co. Ltd.	ThinkPad	FCC/CE	TP00015A

2.4. Block diagram of EUT configuration for test

EUT was controlled by the key work in Continuous Tx mode (>98% duty cycle), and select test channel, wireless mode.

Mode	Setting Tx Power	Channel	Frequency (MHz)
QPSK	/	Low	5180
	/	Middle	5210
	/	High	5240
	/	Low	5736
	/	Middle	5762
	/	High	5814

2.5. Deviations of test standard

No Deviation.

2.6. Test environment conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature range:	21-25℃
Humidity range:	40-75%
Pressure range:	86-106kPa

2.7. Test laboratory

Dongguan Dongdian Testing Service Co., Ltd

Add: No. 17, Zongbu Road 2, Songshan Lake Sci&Tech, Industry Park, Dongguan City, Guangdong Province, China, 523808

Tel: +86-0769-38826678, http://www.dgddt.com, Email: ddt@dgddt.com

CNAS Accreditation No. L6451; A2LA Accreditation No. 3870.01

Designation Number: CN1182; Test Firm Registration Number: 540522

Industry Canada site registration number: 10288A-1

2.8. Measurement uncertainty

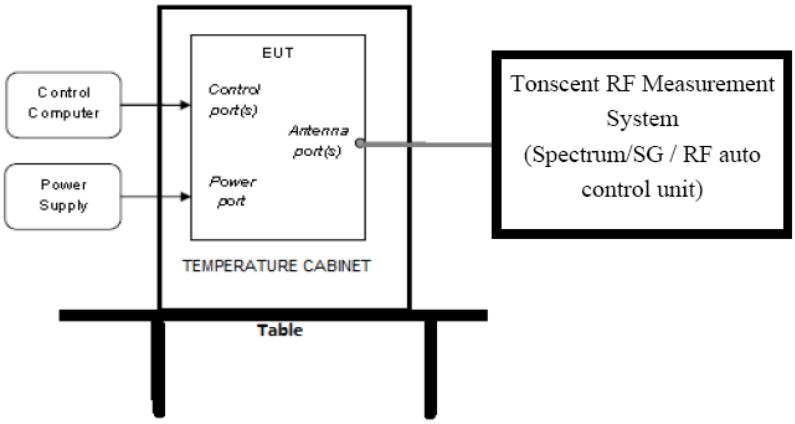
Test Item	Uncertainty
Bandwidth	1.1%
Peak Output Power (Conducted) (Spectrum analyzer)	0.86dB (10 MHz ≤ f < 3.6GHz);
	1.38dB (3.6GHz ≤ f < 8GHz)
Peak Output Power (Conducted) (Power Sensor)	0.74dB
Power Spectral Density	0.74dB (10 MHz ≤ f < 3.6GHz);
	1.38dB (3.6GHz ≤ f < 8GHz)
Frequencies Stability	6.7 x 10^{-8} (Antenna couple method)
	5.5 x 10^{-8} (Conducted method)
Conducted spurious emissions	0.86dB (10 MHz ≤ f < 3.6GHz);
	1.40dB (3.6GHz ≤ f < 8GHz)
	1.66dB (8GHz≤ f < 22GHz)
Uncertainty for radio frequency (RBW<20kHz)	3×10^{-8}
Temperature	0.4℃
Humidity	2%
Uncertainty for Radiation Emission test (30MHz-1GHz)	4.70dB (Antenna Polarize: V)
	4.84dB (Antenna Polarize: H)
Uncertainty for Radiation Emission test (1GHz-40GHz)	4.10dB (1-6GHz)
	4.40dB (6GHz-18GHz)
	3.54dB (18GHz-26GHz)
	4.30dB (26GHz-40GHz)
Uncertainty for Power line conduction emission test	3.32dB (150kHz-30MHz)
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

3. Equipment used during test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
RF Connected Test (Tonscend RF Measurement System)					
Spectrum analyzer	R&S	FSU26	200071	Sep. 29, 2019	1 Year
Wideband Radio Communication tester	R&S	CMW500	117491	Jun. 25, 2019	1 Year
Vector Signal Generator	Agilent	E8267D	US49060192	Sep. 29, 2019	1 Year
Vector Signal Generator	Agilent	N5182A	MY48180737	Jun. 25, 2019	1 Year
Power Sensor	Agilent	U2021XA	MY55150010	Jun. 28, 2019	1 Year
Power Sensor	Agilent	U2021XA	MY55150011	Jun. 28, 2019	1 Year
DC Power Source	MATRIS	MPS-3005L-3	D813058W	Jun. 25, 2019	1 Year
RF Cable	Micable	C10-01-01-1	100309	Sep. 29, 2019	1 Year
Temp&Humi Programmable	ZHIXIANG	ZXGDJS-150L	ZX170110-A	Oct. 21, 2019	1 Year
Test Software	JS Tonscend	JS1120-3	Ver.2.7	N/A	N/A
Radiation 1#chamber					
EMI Test Receiver	R&S	ESU8	100316	Sep. 29, 2019	1 Year
Spectrum analyzer	Agilent	E4447A	MY50180031	Jun. 25, 2019	1 Year
Trilog Broadband Antenna	Schwarzbeck	VULB9163	9163-462	Nov. 15, 2019	1 Year
Active Loop antenna	Schwarzbeck	FMZB-1519	1519-038	Sep. 29, 2019	1 Year
Double Ridged Horn Antenna	R&S	HF907	100276	Nov. 15, 2019	1 Year
Broad Band Horn Antenna	Schwarzbeck	BBHA 9170	790	Sep. 29, 2019	1 Year
Pre-amplifier	A.H.	PAM-0118	360	Sep. 29, 2019	1 Year
Pre-amplifier	TERA-MW	TRLA-0040 G35	101303	Sep. 29, 2019	1 Year
RF Cable	HUBSER	CP-X2+ CP-X1	W11.03+ W12.02	Sep. 29, 2019	1 Year
RF Cable	N/A	5m+6m+1m	06270619	Sep. 29, 2019	1 Year
MI Cable	HUBSER	C10-01-01-1 M	1091629	Sep. 29, 2019	1 Year
Test software	Audix	E3	V 6.11111b	N/A	N/A
Power Line Conducted Emissions Test					
EMI Test Receiver	R&S	ESU8	100316	Sep. 29, 2019	1 Year
LISN 1	R&S	ENV216	101109	Sep. 29, 2019	1 Year
LISN 2	R&S	ESH2-Z5	100309	Sep. 29, 2019	1 Year
Pulse Limiter	R&S	ESH3-Z2	101242	Sep. 29, 2019	1 Year
CE Cable 1	HUBSER	N/A	W10.01	Sep. 29, 2019	1 Year
Test software	Audix	E3	V 6.11111b	N/A	N/A

4. 26dB Bandwidth, 6dB Bandwidth and 99% Bandwidth

4.1. Block diagram of test setup



4.2. Limits

FCC Part15, Subpart E/ RSS-247		
Test Item	Limit	Frequency Range (MHz)
Bandwidth	26 dB Bandwidth	5150-5250
	26 dB Bandwidth	5250-5350
	26 dB Bandwidth	For FCC:5470-5725 For IC:5470-5600 5650-5725
	Minimum 500kHz 6dB Bandwidth	5725-5850

4.3. Test Procedure

(1) Connect EUT's antenna output to spectrum analyzer by RF cable.

Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	For 6dB Bandwidth: RBW=100kHz For 26dB Bandwidth: approximately 1% of the emission bandwidth.
VBW	For 6dB Bandwidth: VBW=300kHz For 26dB Bandwidth: >3RBW
Trace	Max hold
Sweep	Auto couple

(2) Allow the trace to stabilize, 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 26 dB and 6dB relative to the maximum level measured in the fundamental emission.

4.4. Test Result

Test Mode	Antenna	Channel	99% BW[MHz]	EBW[MHz]	Limit [MHz]	Verdict
QPSK	ANT A	5180	15.15	16.500	/	PASS
QPSK	ANT B	5180	15.20	16.500	/	PASS
QPSK	ANT A	5210	15.15	16.500	/	PASS
QPSK	ANT B	5210	15.20	16.550	/	PASS
QPSK	ANT A	5240	15.20	16.550	/	PASS
QPSK	ANT B	5240	15.20	16.550	/	PASS

Test Mode	Antenna	Channel	99% BW[MHz]	6dB Bandwidth [MHz]	6dB Bandwidth Limit [kHz]	Verdict
QPSK	ANT A	5736	14.00	12.34	500	PASS
QPSK	ANT B	5736	14.00	12.50	500	PASS
QPSK	ANT A	5762	14.05	12.22	500	PASS
QPSK	ANT B	5762	14.05	12.34	500	PASS
QPSK	ANT A	5814	14.05	12.34	500	PASS
QPSK	ANT B	5814	14.05	12.42	500	PASS

4.5. Original test data

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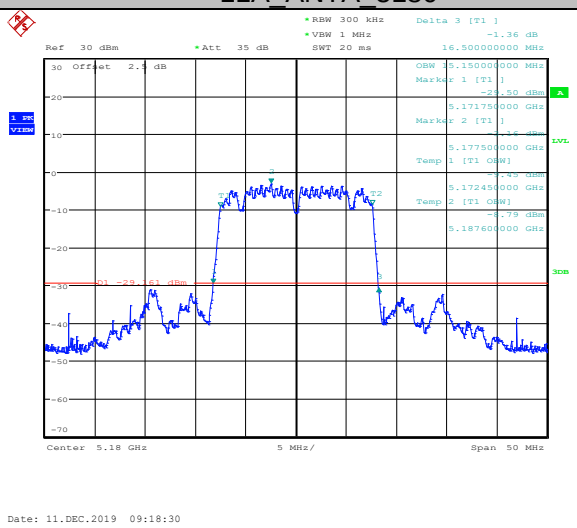

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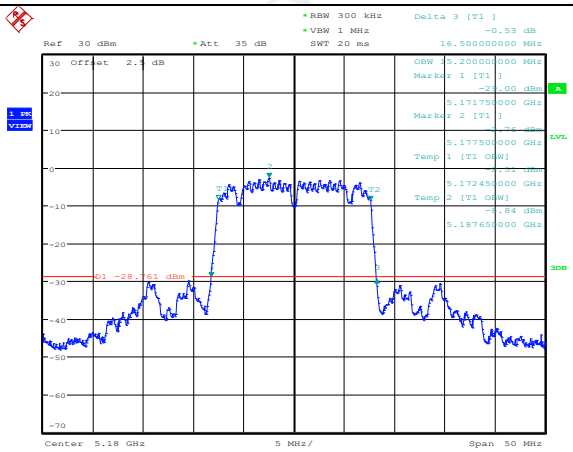

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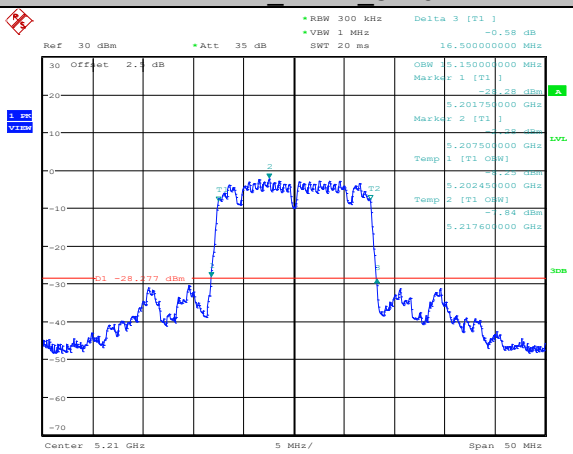

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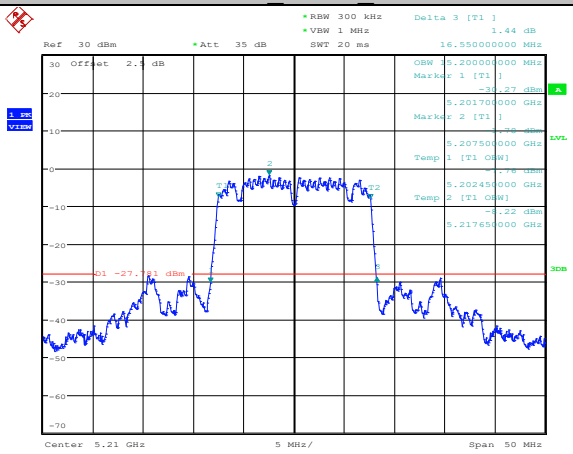

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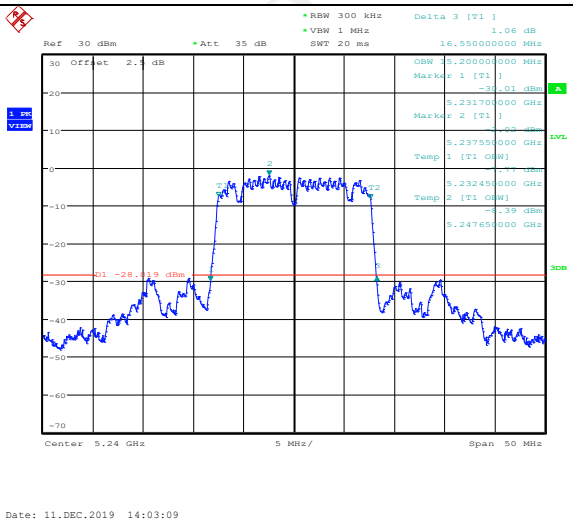

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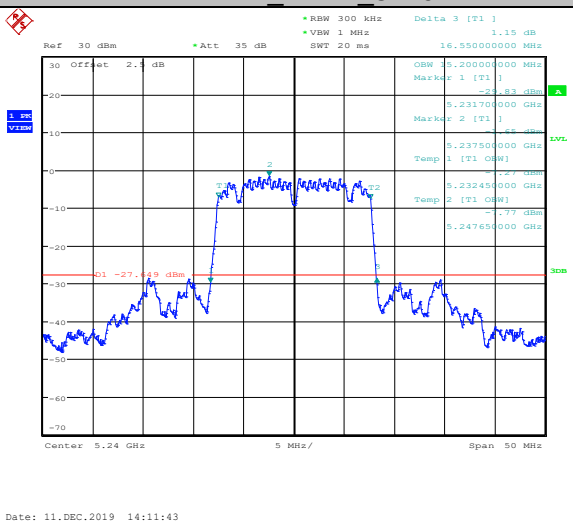

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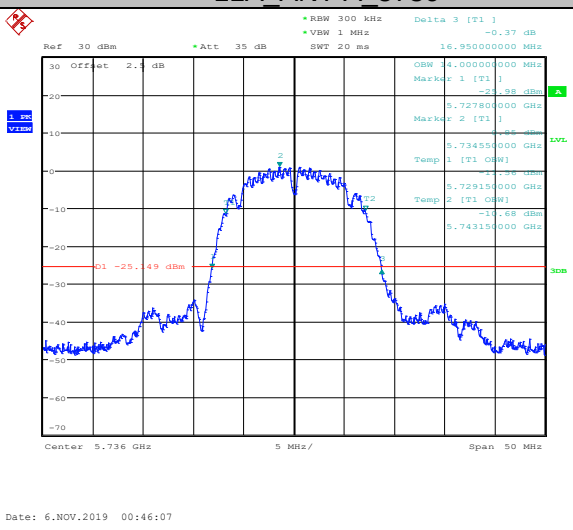

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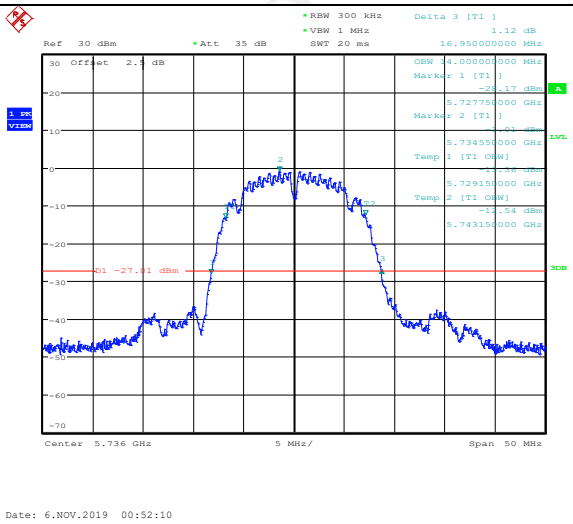

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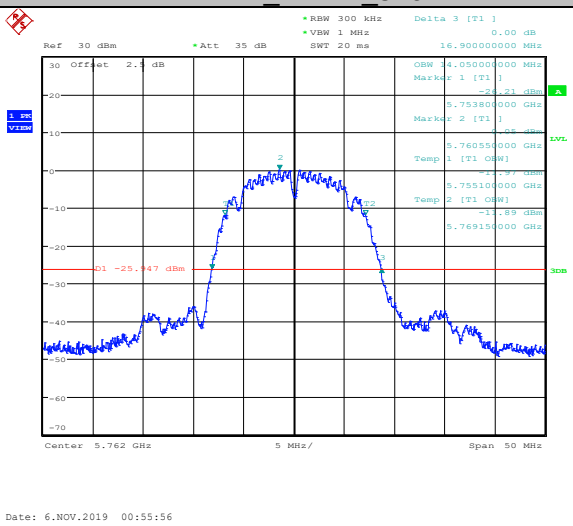

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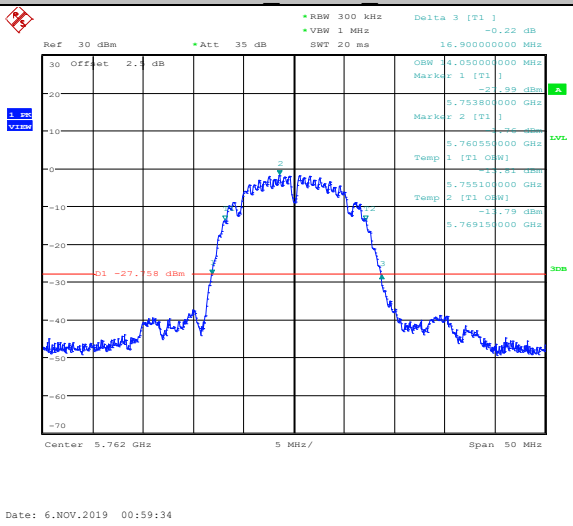

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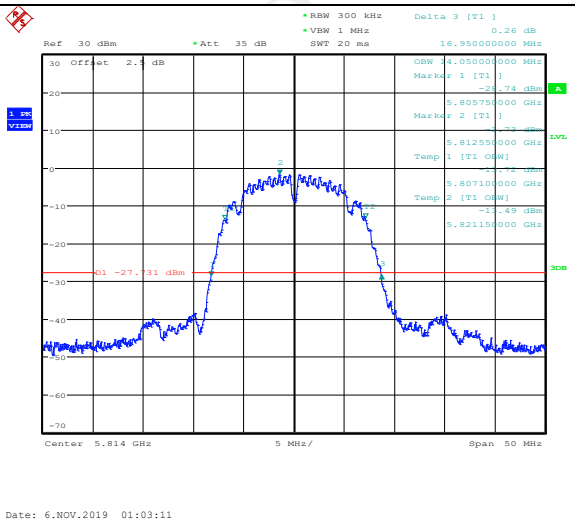

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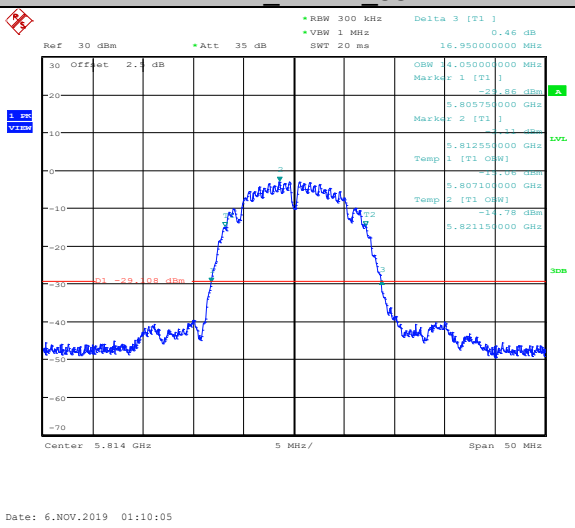

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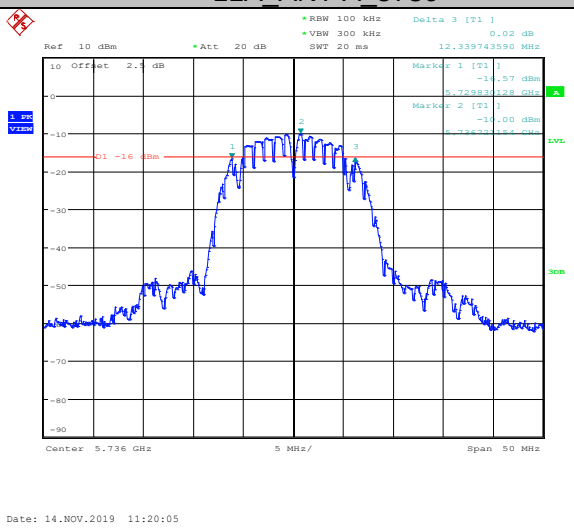

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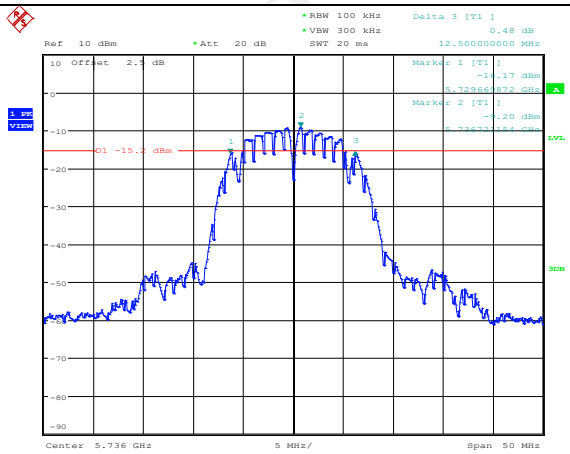

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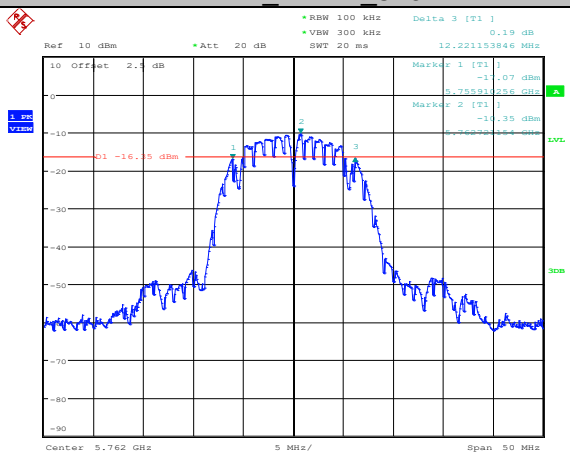

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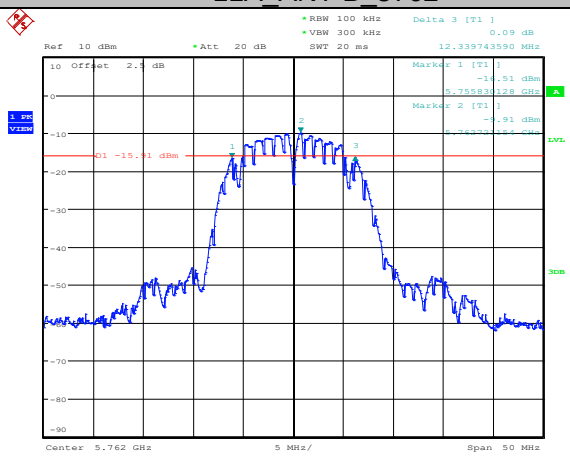

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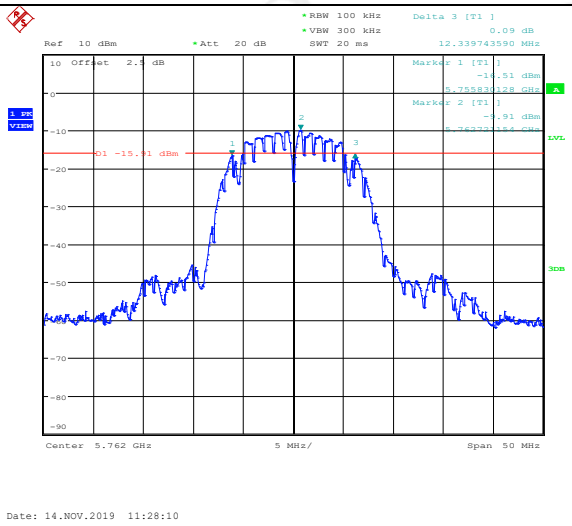

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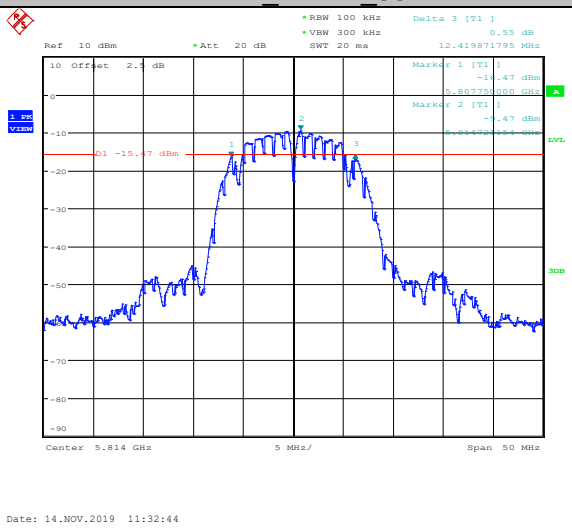

5. Maximum Output Power

5.1. Block diagram of test setup

Same as section 4.1

5.2. Limits

FCC Part15, Subpart E/ RSS-247		
Test Item	Limit	Frequency Range (MHz)
Conducted Output Power	For FCC client devices: 250mW (24dBm)	5150-5250
	For RSS: e.i.r.p. power: not exceed 200 mW(23dBm) or 10 + 10 log10 B	
	250mW (24dBm) or 11 + 10 log10 B	5250-5350
	250mW (24dBm) or 11 + 10 log10 B	For FCC:5470-5725 For IC:5470-5600 5650-5725
	1 Watt (30dBm)	5725-5850
Note: For ISED: B=99% bandwidth.		

5.3. Test Procedure

Connect each EUT's antenna output to Spectrum Analyzer by RF cable and attenuator

5.4. Test Result

Test Mode	Test Channel	Ant	Power Level [dBm]	e.i.r.p. power [dBm]	FCC Limit [dBm]	RSS [dBm]	Verdict
QPSK	5180	ANT A	7.76	10.96	24	21.82	PASS
QPSK	5180	ANT B	7.60	10.80	24	21.82	PASS
QPSK	5210	ANT A	7.81	11.01	24	21.82	PASS
QPSK	5210	ANT B	8.19	11.39	24	21.82	PASS
QPSK	5240	ANT A	8.60	11.80	24	21.82	PASS
QPSK	5240	ANT B	9.08	12.28	24	21.82	PASS
QPSK	5736	ANT A	9.52	12.72	30	30	PASS
QPSK	5736	ANT B	9.04	12.24	30	30	PASS
QPSK	5762	ANT A	9.72	12.92	30	30	PASS
QPSK	5762	ANT B	10.10	13.30	30	30	PASS
QPSK	5814	ANT A	11.09	14.29	30	30	PASS
QPSK	5814	ANT B	9.00	12.20	30	30	PASS

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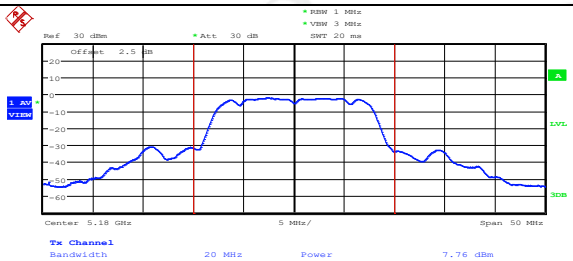

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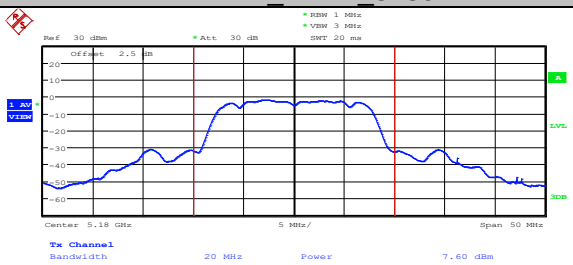

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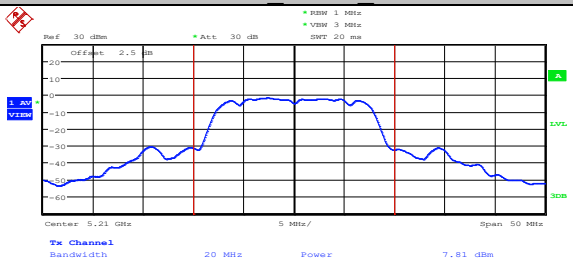

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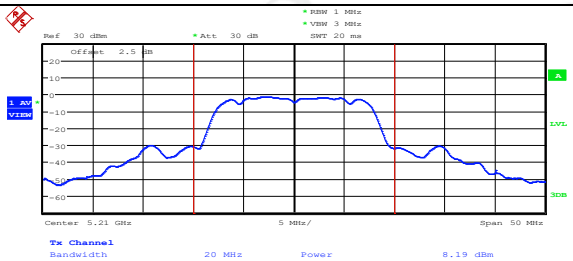

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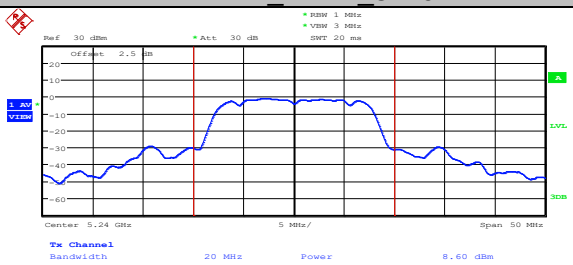
11A_ANTA_5240



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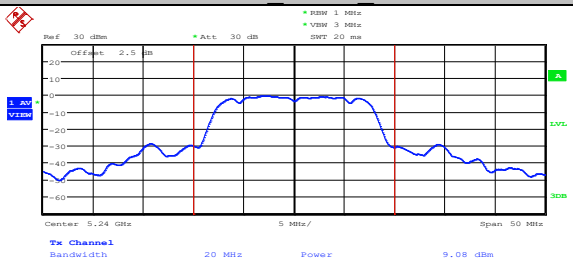

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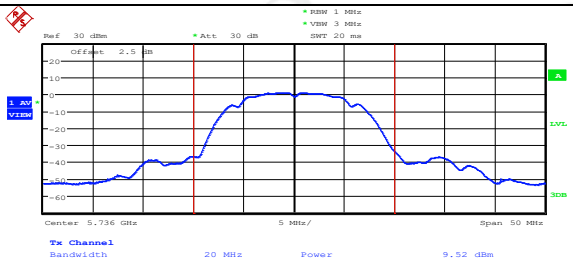
11A_ANT A_5736



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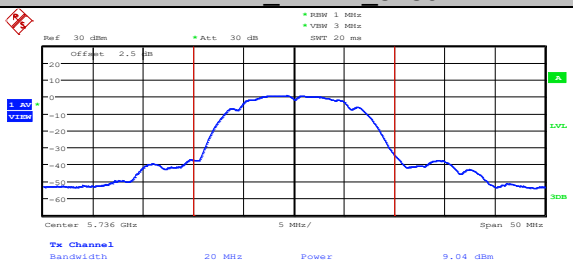

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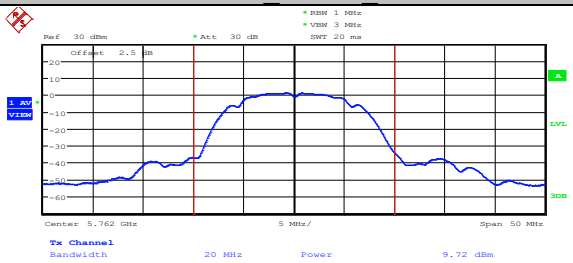
11A_ANT A_5762



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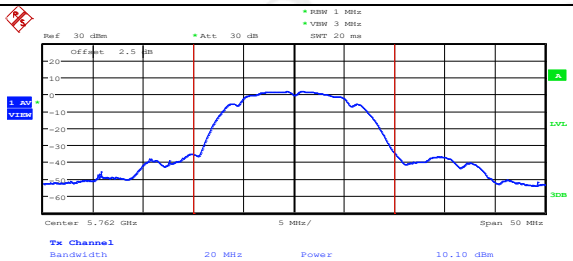

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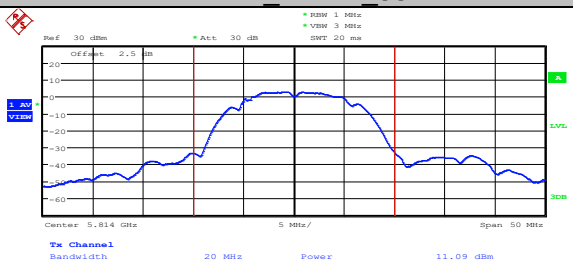
11A_ANT A_5814



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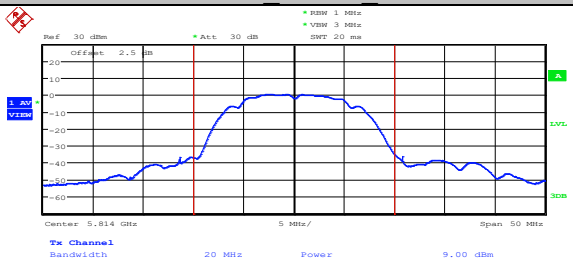
11A_ANT B_5814



Date: 6.NOV.2019 01:12:41

6. Power Spectral Density

6.1. Block diagram of test setup

Same with 4.1

6.2. Limits

FCC Part15, Subpart E/ RSS-247		
Test Item	Limit	Frequency Range (MHz)
Power Spectral Density	For FCC: Other than Mobile and portable:17dBm/MHz Mobile and portable:11dBm/MHz	5150-5250
	For RSS eirp:10dBm/MHz	
	11dBm/MHz	5250-5350
	11dBm/MHz	For FCC:5470-5725 For IC:5470-5600 5650-5725
	30dBm/500kHz	5725-5850

6.3. Test Procedure

The transmitter output was connected to a spectrum analyzer. Power density was measured by spectrum analyzer with 1MHz RBW and 3MHz VBW.
Connect the UUT to the spectrum analyser and use the following settings:

5150MHz~5250MHz, 5250MHz~5350MHz, 5470MHz~5725MHz

Center Frequency	The centre frequency of the channel under test
Detector	RMS
RBW	1MHz
VBW	≥3 × RBW
Span	Encompass the entire emissions bandwidth (EBW) of the signal
Trace	Max hold
Sweep time	Auto

5725MHz-5850MHz

Center Frequency	The centre frequency of the channel under test
Detector	RMS
RBW	500kHz
VBW	≥3 × RBW
Span	Encompass the entire emissions bandwidth (EBW) of the signal
Trace	Max hold
Sweep time	Auto

Note:
1. For UNII-3, according to KDB publication 789033 D02 General U-NII Test Procedures New Rules v02r01, section II.F.5., it is acceptable to set RBW at 1MHz and VBW at 3MHz if the spectrum analyzer does not have 500kHz RBW.
2. The value measured with RBW=1MHz is to be added with 10log(500kHz/1MHz) which is - 3dB. For example, if the measured value is +10dBm using RBW=1MHz (that is +10dBm/MHz), then the converted value will be +7dBm/500kHz.
Allow trace to fully stabilize and use the peak marker function to determine the maximum amplitude level within the RBW.

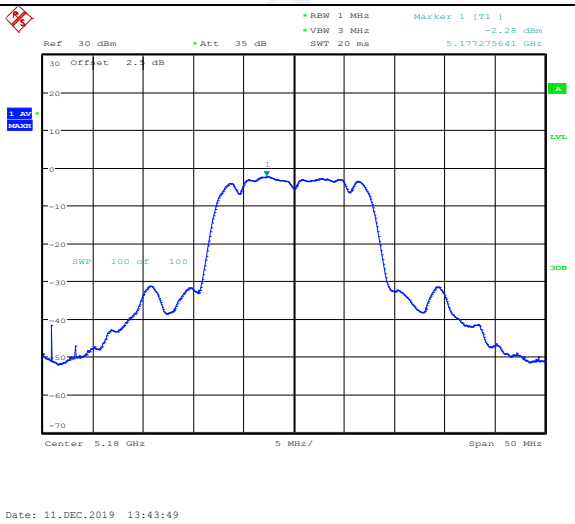
6.4. Test Result

Test Mode	Test Channel	Ant	PSD [dBm/MHz]	PSD eirp [dBm/MHz]	FCC Limit [dBm/MHz]	ISED Limit [dBm/MHz]	Verdict
QPSK	5180	ANT A	-2.28	0.92	11	10	PASS
QPSK	5180	ANT B	-2.09	1.11	11	10	PASS
QPSK	5210	ANT A	-2.04	1.16	11	10	PASS
QPSK	5210	ANT B	-1.81	1.39	11	10	PASS
QPSK	5240	ANT A	-1.59	1.61	11	10	PASS
QPSK	5240	ANT B	-0.77	2.43	11	10	PASS

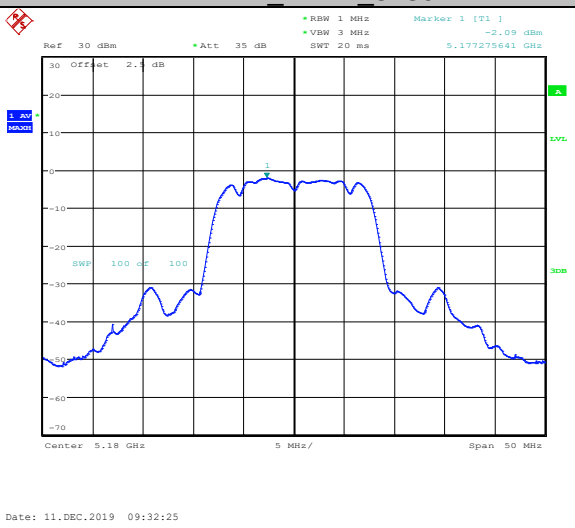
Test Mode	Test Channel	Ant	PSD [dBm/500kHz]	PSD eirp [dBm/500kHz]	FCC Limit [dBm/500kHz]	ISED Limit [dBm/500kHz]	Verdict
QPSK	5736	ANT A	1.12	4.32	30	30	PASS
QPSK	5736	ANT B	0.25	3.45	30	30	PASS
QPSK	5762	ANT A	1.13	4.33	30	30	PASS
QPSK	5762	ANT B	0.97	4.17	30	30	PASS
QPSK	5814	ANT A	2.97	6.17	30	30	PASS
QPSK	5814	ANT B	0.68	3.88	30	30	PASS

6.5. Original test data

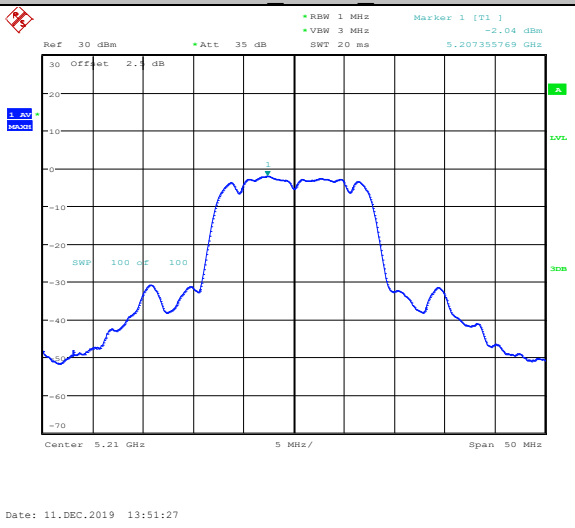
11A_ANTA_5180



11A_ANTB_5180



11A_ANTA_5210



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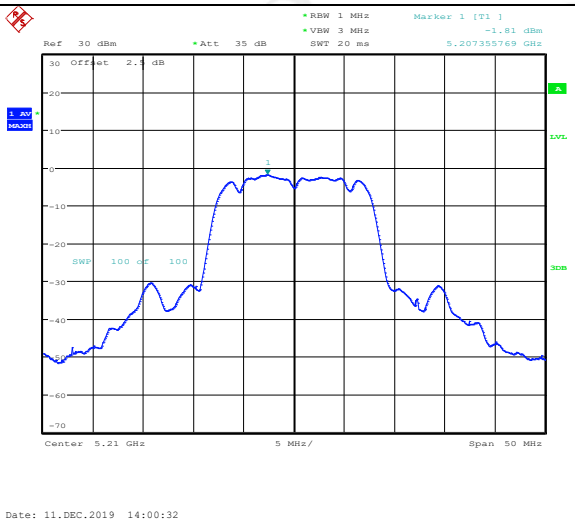
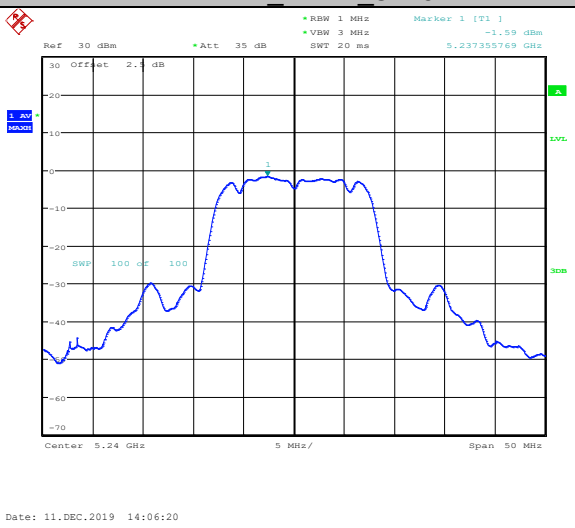
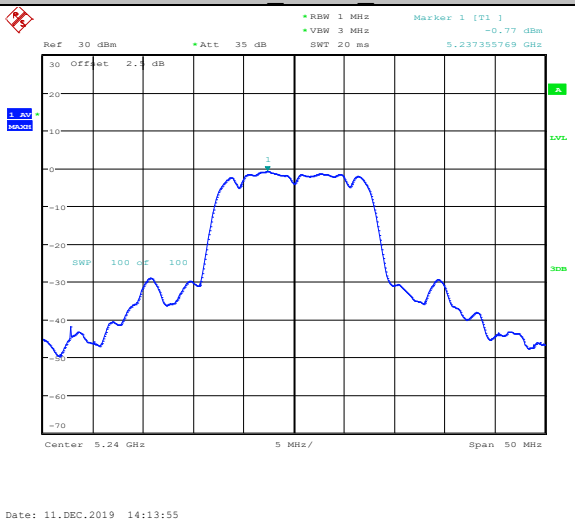


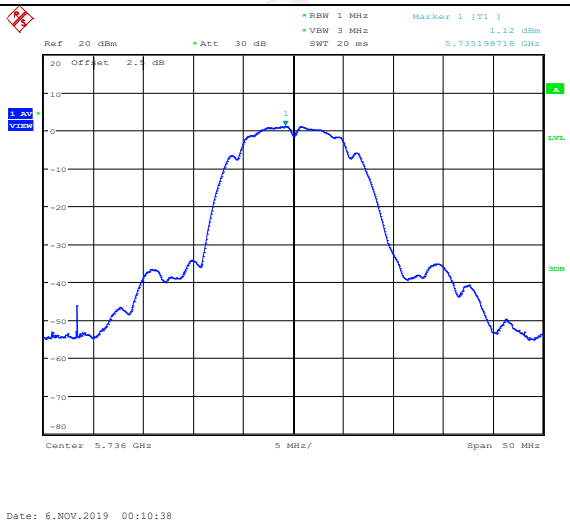
11A_ANTA_5240



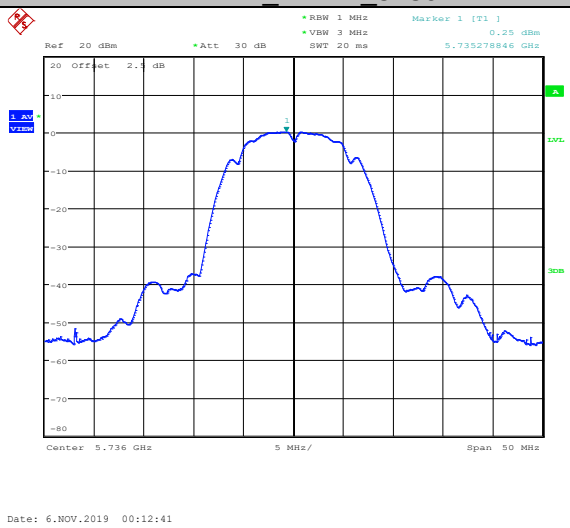
11A_ANTB_5240



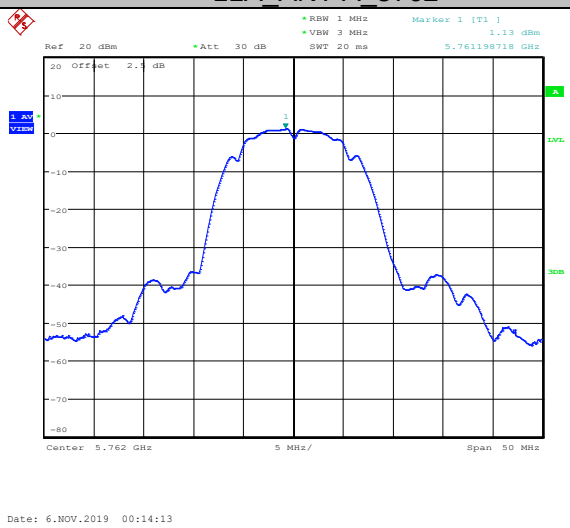
11A_ANT A_5736



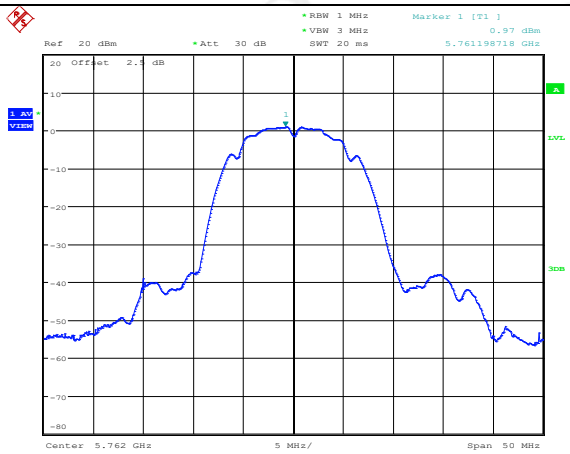
11A_ANT B_5736



11A_ANT A_5762



11A_ANT B_5762



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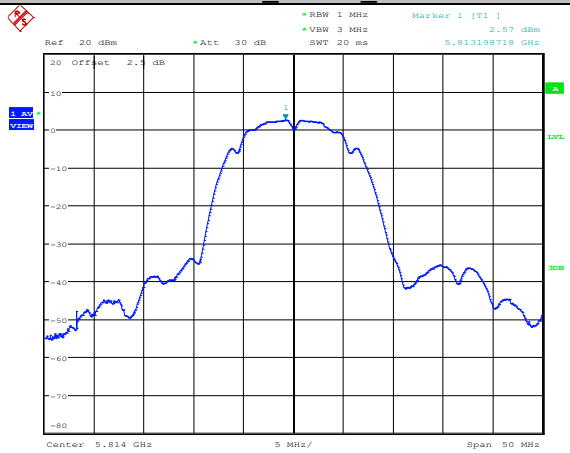
11A_ANT A_5814



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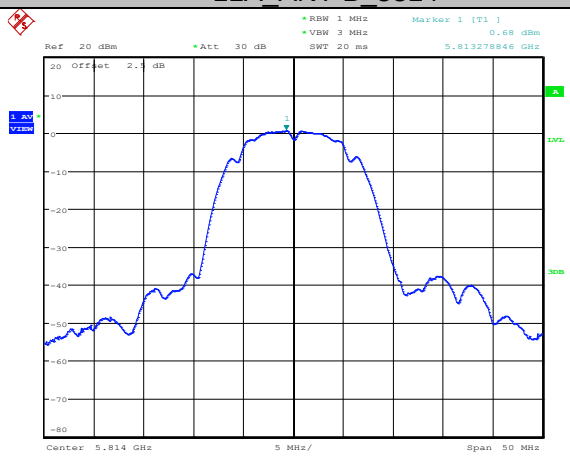


Date: 6.NOV.2019 00:17:51

7. Frequency Stability Measurement

7.1. Limit of Frequency Stability

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 user's manual.

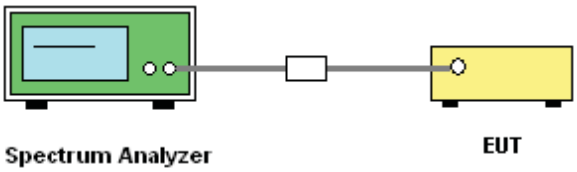
7.2. Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

7.3. Test Procedures

(1) To ensure emission at the band edge is maintained within the authorized band, those values shall be measured by radiation emissions at upper and lower frequency points, and finally compensated by frequency deviation as procedures below.
(2) The EUT was operated at the maximum output power, and connected to the spectrum analyzer, which is set to maximum hold function and peak detector. The peak value of the power envelope was measured and noted. The upper and lower frequency points were respectively measured relatively 10dB lower than the measured peak value.
(3) The frequency deviation was calculated by adding the upper frequency point and the lower frequency point divided by two. Those detailed values of frequency deviation are provided in table below.

7.4. Test Setup



7.5. Test Result

Voltage								
TestMode	Antenna	Channel	Voltage [Vdc]	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
11A	ANTA	5180	NV	NT	28200	5.444015	20	PASS
11A	ANTA	5180	LV	NT	28000	5.405405	20	PASS
11A	ANTA	5180	HV	NT	28000	5.405405	20	PASS
11A	ANTB	5180	NV	NT	28000	5.405405	20	PASS
11A	ANTB	5180	LV	NT	28000	5.405405	20	PASS
11A	ANTB	5180	HV	NT	28200	5.444015	20	PASS
11A	ANTA	5210	NV	NT	28800	5.527831	20	PASS
11A	ANTA	5210	LV	NT	28600	5.489443	20	PASS
11A	ANTA	5210	HV	NT	28800	5.527831	20	PASS
11A	ANTB	5210	NV	NT	28600	5.489443	20	PASS
11A	ANTB	5210	LV	NT	28800	5.527831	20	PASS
11A	ANTB	5210	HV	NT	28800	5.527831	20	PASS
11A	ANTA	5240	NV	NT	28800	5.496183	20	PASS
11A	ANTA	5240	LV	NT	28800	5.496183	20	PASS
11A	ANTA	5240	HV	NT	28800	5.496183	20	PASS

11A	ANTB	5240	NV	NT	29200	5.572519	20	PASS
11A	ANTB	5240	LV	NT	29200	5.572519	20	PASS
11A	ANTB	5240	HV	NT	29200	5.572519	20	PASS

Voltage								
TestMode	Antenna	Channel	Voltage [Vdc]	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
11A	ANT A	5736	NV	NT	32800	5.718271	20	PASS
11A	ANT A	5736	LV	NT	32600	5.683403	20	PASS
11A	ANT A	5736	HV	NT	32200	5.613668	20	PASS
11A	ANT B	5736	NV	NT	33200	5.788006	20	PASS
11A	ANT B	5736	LV	NT	33400	5.822873	20	PASS
11A	ANT B	5736	HV	NT	33400	5.822873	20	PASS
11A	ANT A	5762	NV	NT	35400	6.1437	20	PASS
11A	ANT A	5762	LV	NT	35400	6.1437	20	PASS
11A	ANT A	5762	HV	NT	35400	6.1437	20	PASS
11A	ANT B	5762	NV	NT	36000	6.247831	20	PASS
11A	ANT B	5762	LV	NT	36000	6.247831	20	PASS
11A	ANT B	5762	HV	NT	35400	6.1437	20	PASS
11A	ANT A	5814	NV	NT	37000	6.363949	20	PASS
11A	ANT A	5814	LV	NT	37000	6.363949	20	PASS
11A	ANT A	5814	HV	NT	37000	6.363949	20	PASS
11A	ANT B	5814	NV	NT	37400	6.432749	20	PASS
11A	ANT B	5814	LV	NT	37400	6.432749	20	PASS
11A	ANT B	5814	HV	NT	37400	6.432749	20	PASS

Temperature								
TestMode	Antenna	Channel	Voltage [Vdc]	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
11A	ANTA	5180	NV	-30	28200	5.444015	20	PASS
11A	ANTA	5180	NV	-20	28000	5.405405	20	PASS
11A	ANTA	5180	NV	-10	28000	5.405405	20	PASS
11A	ANTA	5180	NV	0	28000	5.405405	20	PASS
11A	ANTA	5180	NV	10	28000	5.405405	20	PASS
11A	ANTA	5180	NV	20	28000	5.405405	20	PASS
11A	ANTA	5180	NV	30	28000	5.405405	20	PASS
11A	ANTA	5180	NV	40	28000	5.405405	20	PASS
11A	ANTA	5180	NV	50	28000	5.405405	20	PASS
11A	ANTB	5180	NV	-30	28000	5.405405	20	PASS
11A	ANTB	5180	NV	-20	28000	5.405405	20	PASS
11A	ANTB	5180	NV	-10	28000	5.405405	20	PASS
11A	ANTB	5180	NV	0	28200	5.444015	20	PASS
11A	ANTB	5180	NV	10	28000	5.405405	20	PASS
11A	ANTB	5180	NV	20	28000	5.405405	20	PASS
11A	ANTB	5180	NV	30	28000	5.405405	20	PASS
11A	ANTB	5180	NV	40	28200	5.444015	20	PASS
11A	ANTB	5180	NV	50	28200	5.444015	20	PASS
11A	ANTA	5210	NV	-30	28600	5.489443	20	PASS
11A	ANTA	5210	NV	-20	28600	5.489443	20	PASS
11A	ANTA	5210	NV	-10	28600	5.489443	20	PASS
11A	ANTA	5210	NV	0	28600	5.489443	20	PASS
11A	ANTA	5210	NV	10	28600	5.489443	20	PASS

11A	ANTA	5210	NV	20	28600	5.489443	20	PASS
11A	ANTA	5210	NV	30	28600	5.489443	20	PASS
11A	ANTA	5210	NV	40	28600	5.489443	20	PASS
11A	ANTA	5210	NV	50	28600	5.489443	20	PASS
11A	ANTB	5210	NV	-30	28800	5.527831	20	PASS
11A	ANTB	5210	NV	-20	28800	5.527831	20	PASS
11A	ANTB	5210	NV	-10	29000	5.566219	20	PASS
11A	ANTB	5210	NV	0	28800	5.527831	20	PASS
11A	ANTB	5210	NV	10	28800	5.527831	20	PASS
11A	ANTB	5210	NV	20	28800	5.527831	20	PASS
11A	ANTB	5210	NV	30	28800	5.527831	20	PASS
11A	ANTB	5210	NV	40	28800	5.527831	20	PASS
11A	ANTB	5210	NV	50	28800	5.527831	20	PASS
11A	ANTA	5240	NV	-30	28800	5.496183	20	PASS
11A	ANTA	5240	NV	-20	28800	5.496183	20	PASS
11A	ANTA	5240	NV	-10	28800	5.496183	20	PASS
11A	ANTA	5240	NV	0	28800	5.496183	20	PASS
11A	ANTA	5240	NV	10	28800	5.496183	20	PASS
11A	ANTA	5240	NV	20	28800	5.496183	20	PASS
11A	ANTA	5240	NV	30	28800	5.496183	20	PASS
11A	ANTA	5240	NV	40	28800	5.496183	20	PASS
11A	ANTA	5240	NV	50	28800	5.496183	20	PASS
11A	ANTB	5240	NV	-30	29400	5.610687	20	PASS
11A	ANTB	5240	NV	-20	29200	5.572519	20	PASS
11A	ANTB	5240	NV	-10	29400	5.610687	20	PASS
11A	ANTB	5240	NV	0	29200	5.572519	20	PASS
11A	ANTB	5240	NV	10	29400	5.610687	20	PASS
11A	ANTB	5240	NV	20	29400	5.610687	20	PASS
11A	ANTB	5240	NV	30	29200	5.572519	20	PASS
11A	ANTB	5240	NV	40	29400	5.610687	20	PASS
11A	ANTB	5240	NV	50	29400	5.610687	20	PASS

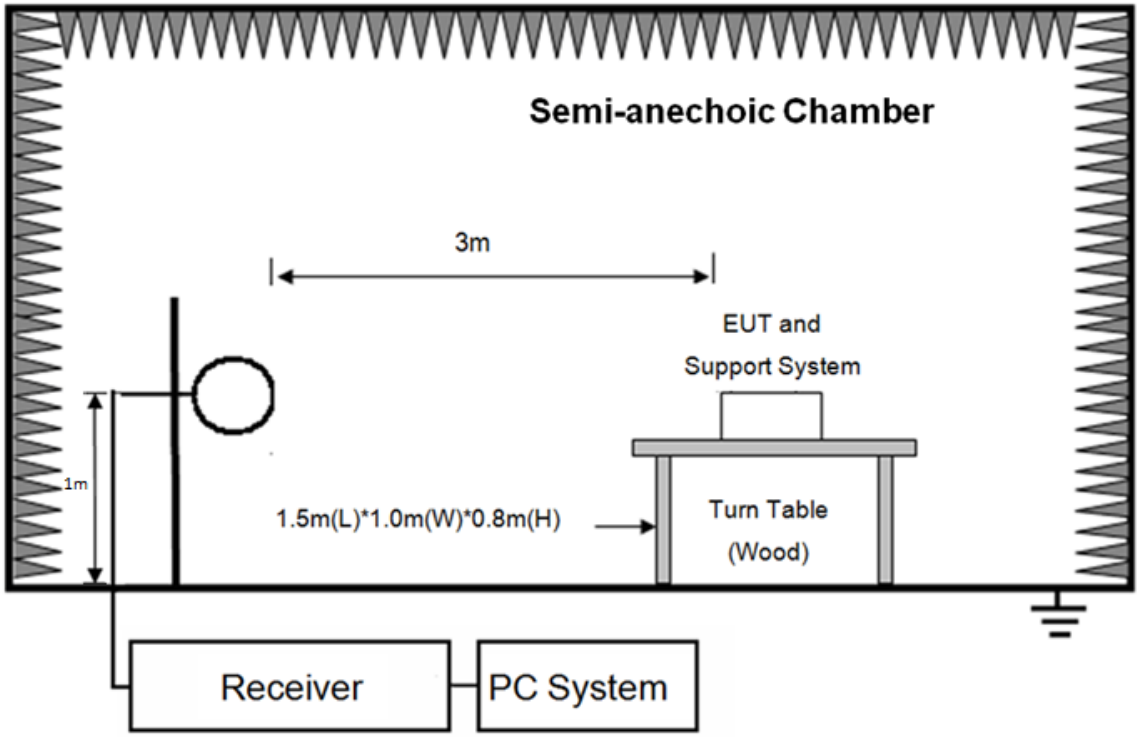
Temperature								
TestMode	Antenna	Channel	Voltage [Vdc]	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
11A	ANT A	5736	NV	-30	32000	5.578801	20	PASS
11A	ANT A	5736	NV	-20	31600	5.509066	20	PASS
11A	ANT A	5736	NV	-10	31600	5.509066	20	PASS
11A	ANT A	5736	NV	0	31400	5.474198	20	PASS
11A	ANT A	5736	NV	10	31200	5.439331	20	PASS
11A	ANT A	5736	NV	20	31200	5.439331	20	PASS
11A	ANT A	5736	NV	30	31200	5.439331	20	PASS
11A	ANT A	5736	NV	40	31200	5.439331	20	PASS
11A	ANT A	5736	NV	50	31000	5.404463	20	PASS
11A	ANT B	5736	NV	-30	33600	5.857741	20	PASS
11A	ANT B	5736	NV	-20	33600	5.857741	20	PASS
11A	ANT B	5736	NV	-10	33600	5.857741	20	PASS
11A	ANT B	5736	NV	0	33600	5.857741	20	PASS
11A	ANT B	5736	NV	10	33800	5.892608	20	PASS
11A	ANT B	5736	NV	20	33800	5.892608	20	PASS
11A	ANT B	5736	NV	30	34000	5.927476	20	PASS
11A	ANT B	5736	NV	40	34000	5.927476	20	PASS

11A	ANT B	5736	NV	50	34000	5.927476	20	PASS
11A	ANT A	5762	NV	-30	35400	6.1437	20	PASS
11A	ANT A	5762	NV	-20	35200	6.10899	20	PASS
11A	ANT A	5762	NV	-10	35400	6.1437	20	PASS
11A	ANT A	5762	NV	0	35400	6.1437	20	PASS
11A	ANT A	5762	NV	10	35400	6.1437	20	PASS
11A	ANT A	5762	NV	20	35600	6.17841	20	PASS
11A	ANT A	5762	NV	30	35600	6.17841	20	PASS
11A	ANT A	5762	NV	40	35600	6.17841	20	PASS
11A	ANT A	5762	NV	50	36000	6.247831	20	PASS
11A	ANT B	5762	NV	-30	35400	6.1437	20	PASS
11A	ANT B	5762	NV	-20	35600	6.17841	20	PASS
11A	ANT B	5762	NV	-10	35600	6.17841	20	PASS
11A	ANT B	5762	NV	0	35600	6.17841	20	PASS
11A	ANT B	5762	NV	10	35600	6.17841	20	PASS
11A	ANT B	5762	NV	20	35800	6.21312	20	PASS
11A	ANT B	5762	NV	30	35600	6.17841	20	PASS
11A	ANT B	5762	NV	40	35800	6.21312	20	PASS
11A	ANT B	5762	NV	50	35800	6.21312	20	PASS
11A	ANT A	5814	NV	-30	36800	6.329549	20	PASS
11A	ANT A	5814	NV	-20	36800	6.329549	20	PASS
11A	ANT A	5814	NV	-10	36800	6.329549	20	PASS
11A	ANT A	5814	NV	0	37000	6.363949	20	PASS
11A	ANT A	5814	NV	10	37000	6.363949	20	PASS
11A	ANT A	5814	NV	20	37000	6.363949	20	PASS
11A	ANT A	5814	NV	30	37200	6.398349	20	PASS
11A	ANT A	5814	NV	40	37200	6.398349	20	PASS
11A	ANT A	5814	NV	50	37000	6.363949	20	PASS
11A	ANT B	5814	NV	-30	37400	6.432749	20	PASS
11A	ANT B	5814	NV	-20	37400	6.432749	20	PASS
11A	ANT B	5814	NV	-10	37400	6.432749	20	PASS
11A	ANT B	5814	NV	0	37400	6.432749	20	PASS
11A	ANT B	5814	NV	10	37400	6.432749	20	PASS
11A	ANT B	5814	NV	20	37400	6.432749	20	PASS
11A	ANT B	5814	NV	30	37400	6.432749	20	PASS
11A	ANT B	5814	NV	40	37400	6.432749	20	PASS
11A	ANT B	5814	NV	50	37200	6.398349	20	PASS

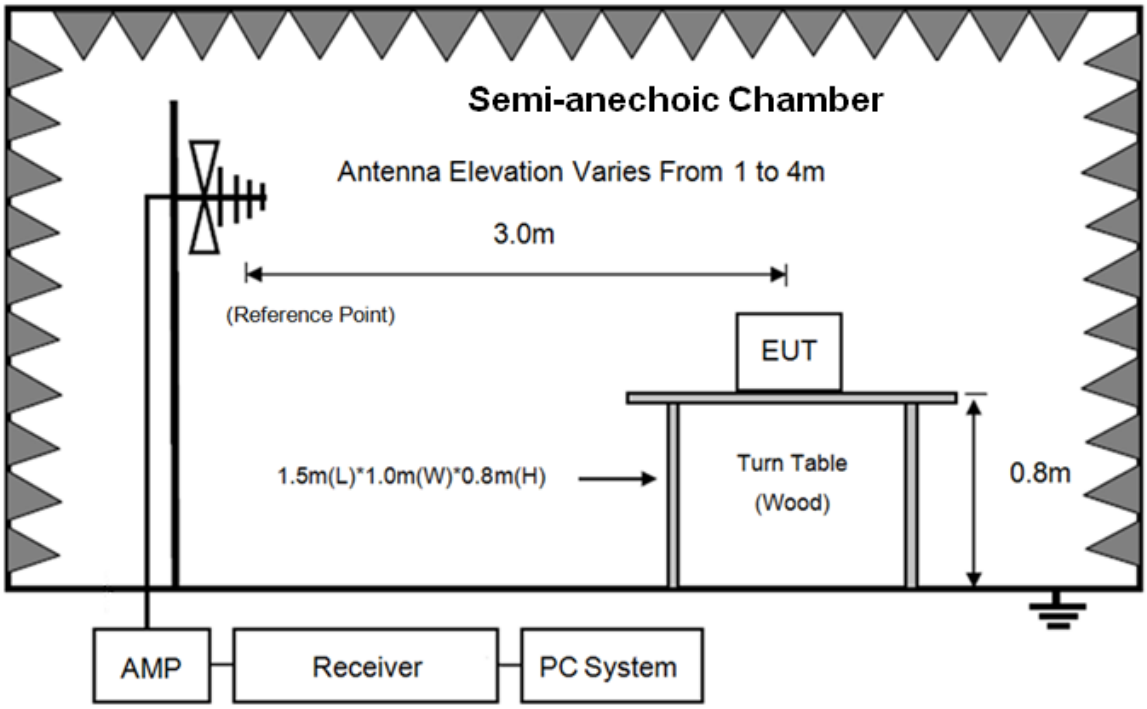
8. Emissions in restricted frequency bands

8.1. Block diagram of test setup

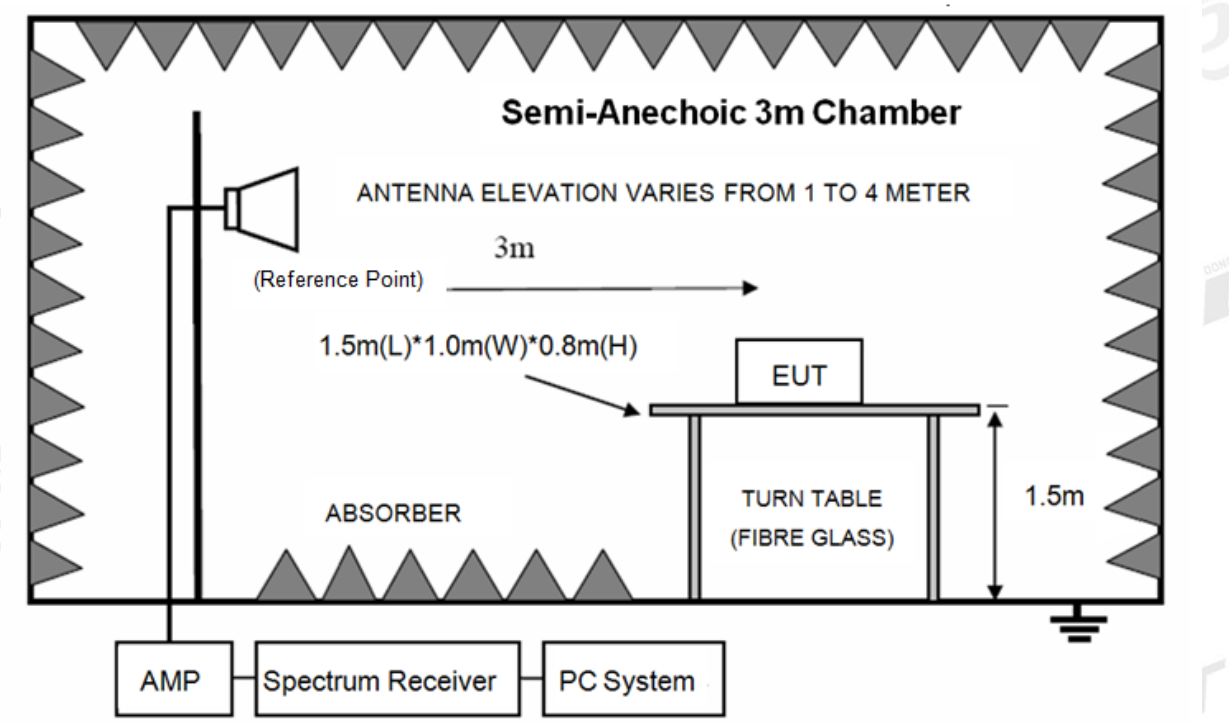
In 3m Anechoic Chamber Test Setup Diagram for 9kHz-30MHz



In 3m Anechoic Chamber Test Setup Diagram for 30MHz-1GHz



In 3m Anechoic Chamber Test Setup Diagram for frequency above 1GHz



Note: For harmonic emissions test an appropriate high pass filter was inserted in the input port of AMP.

8.2. Limit

8.3.1 FCC 15.205 Restricted frequency band

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
10.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.1772&4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.2072&4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	([2])
13.36-13.41			

8.3.2 FCC 15.209 Limit.

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/m
0.009 ~ 0.490	300	2400/F(kHz)	67.6-20log(F)
0.490 ~ 1.705	30	24000/F(kHz)	87.6-20log(F)
1.705 ~ 30.0	30	30	29.54
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	

Note: (1) The emission limits shown in the above table are based on measurements employing a CISPR QP detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000MHz.Radiated emissions limits in these three bands are based on measurements employing an average detector.

(2) At frequencies below 30MHz, measurement may be performed at a distance closer than that specified, and the limit at closer measurement distance can be extrapolated by below formula:

$$Limit_{3m}(dBuV/m) = Limit_{30m}(dBuV/m) + 40Log(30m/3m)$$

8.3.3 Limit for this EUT

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions or comply with 15.209 limits.

8.3. Test Procedure

(1) EUT height should be 0.8m for below 1GHz at a semi‐anechoic chamber while EUT height should be 1.5m for above 1GHz at full chamber or semi‐anechoic chamber ground with absorbers

(2) Setup EUT and assistant system according clause 2.3 and 8.2

(3) Test antenna was located 3m from the EUT on an adjustable mast, and the antenna used as below table.

Test frequency range	Test antenna used	Test distance
9kHz-30MHz	Active Loop antenna	3m
30MHz-1GHz	Trilog Broadband Antenna	3m
1GHz-18GHz	Double Ridged Horn Antenna(1GHz-18GHz)	3m
18GHz-40GHz	Horn Antenna(18GHz-40GHz)	1m

According ANSI C63.10:2013 clause 6.4.4.2 and 6,5.3, for measurements below 30 MHz, the loop antenna was positioned with its plane vertical from the EUT and rotated about its vertical axis for maximum response at each azimuth position around the EUT. And the loop antenna also be positioned with its plane horizontal at the specified distance from the EUT. The center of the loop is 1 m above the

ground. for measurement above 30MHz, the Trilog Broadband Antenna or Horn Antenna was located 3m from EUT, Measurements were made with the antenna positioned in both the horizontal and vertical planes of Polarization, and the measurement antenna was varied from 1 m to 4 m. in height above the reference ground plane to obtain the maximum signal strength.

(4) Below pre-scan procedure was first performed in order to find prominent frequency spectrum radiated emissions from 9kHz to 40GHz:

(a) Scanning the peak frequency spectrum with the antenna specified in step (3), and the EUT was rotated 360 degree, the antenna height was varied from 1m to 4m (Except loop antenna, it's fixed 1m above ground.)

(b) Change work frequency or channel of device if practicable.

(c) Change modulation type of device if practicable.

(d) Change power supply range from 85% to 115% of the rated supply voltage

(e) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions.

Spectrum frequency from 9kHz to 40GHz (tenth harmonic of fundamental frequency) was investigated, and no any obvious emission were detected from 9kHz to 30MHz and 18GHz to 40GHz, so below final test was performed with frequency range from 30MHz to 18GHz.

(5) For final emissions measurements at each frequency of interest, the EUT was rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipment and all of the interface cables were changed according to ANSI C63.10:2013 on Radiated Emission test.

(6) The emissions from 9kHz to 1GHz were measured based on CISPR QP detector except for the frequency bands 9-90kHz, 110-490kHz, for emissions from 9kHz-90kHz,110kHz-490kHz and above 1GHz were measured based on average detector, for emissions above 1GHz, peak emissions also be measured and need comply with Peak limit.

(7) The emissions from 9kHz to 1GHz, QP or average values were measured with EMI receiver with below RBW

Frequency band	RBW
9kHz-150kHz	200Hz
150kHz-30MHz	9kHz
30MHz-1GHz	120kHz

(8) For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1MHz, VBW is set at 3MHz, Peak detector for Peak measure, RMS detector for AV value

8.4. Test result

PASS. (See below detailed test result)

All the emissions except fundamental emission from 9kHz to 40GHz were comply with 15.209 limit.

Note1: According exploratory test no any obvious emission was detected from 9kHz to 30MHz and 18GHz to 40GHz, so the final test was performed with frequency range from 30MHz to 18GHz and recorded in below.

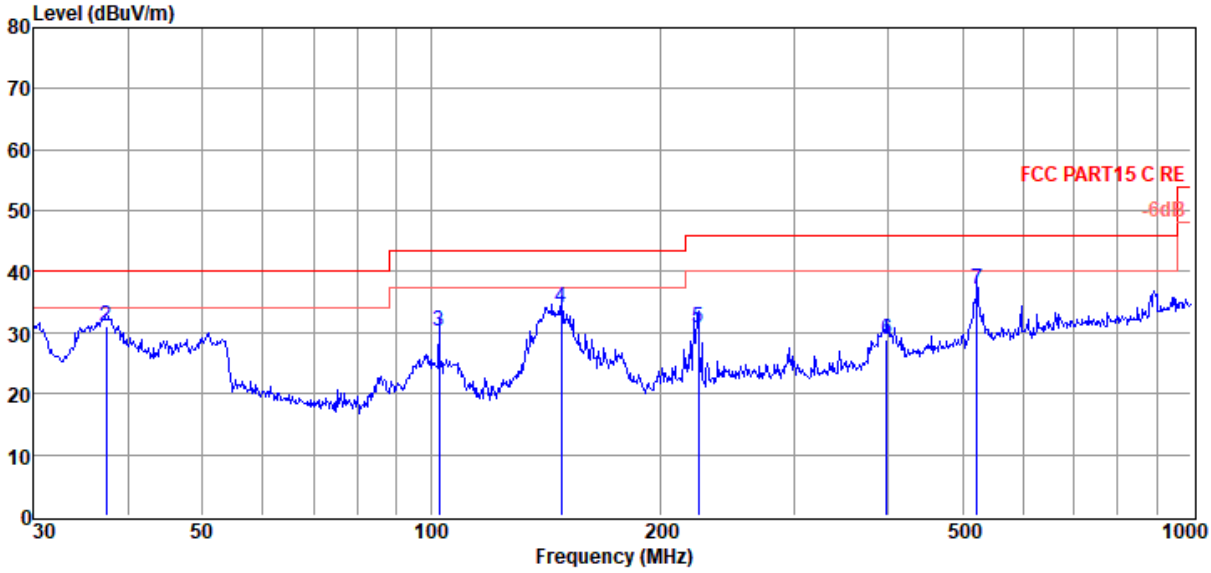
Note2: For emissions below 1GHz, according exploratory explorer test, when change Tx mode and channel, have no distinct influence on emissions level, so for emissions below 1GHz, the final test was only performed with EUT working in ANT A QPSK, 5814 MHz.

Radiated Emission test (below 1GHz)

TR-4-E-009 Radiated Emission Test Result

Test Site	: DDT 3m Chamber 1#	D:\2019 RE1# Report Data\Q19080513-1E Bar9.1\FCC BELOW1G.EM6	
Test Date	: 2019-11-03	**Tested By**	: Jacky
EUT	: SOUNDBAR	**Model Number**	: BAR 9.1 CNTR
Power Supply	: AC 120 V/ 60Hz	**Test Mode**	: Tx mode
Condition	: Temp:24.5'C,Humi:55%,Press:101.4kPa	**Antenna/Distance**	: 2018 VULB 9163 1#/3m/VERTICAL
Memo	:		

Data: 9



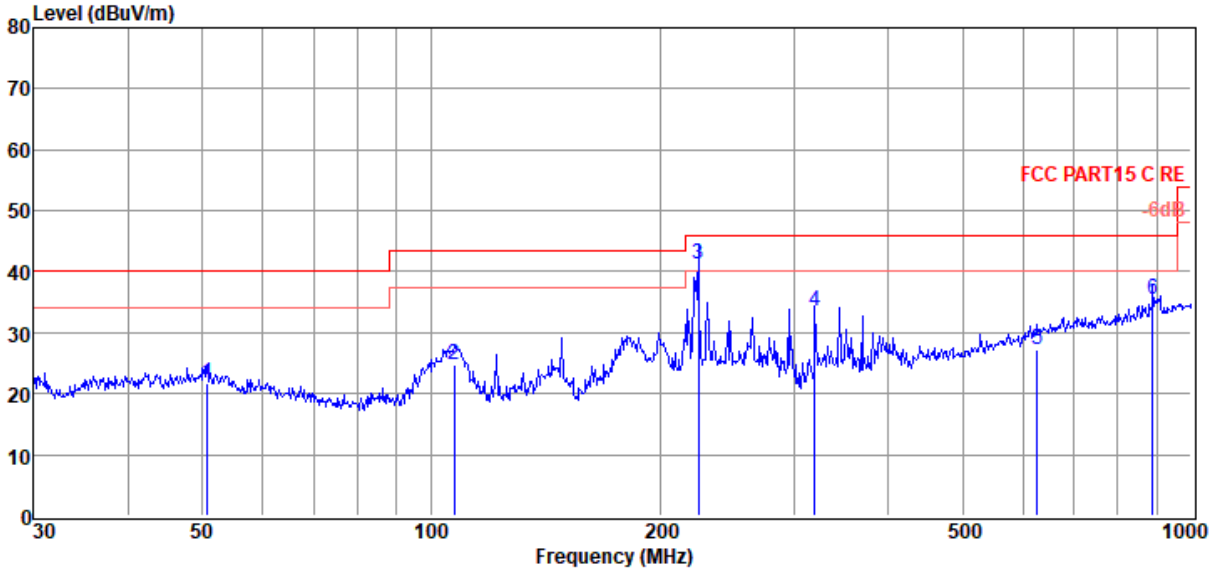
Item (Mark)	Freq. (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	Cable Loss dB	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	30.53		11.24	3.65	-485.11	40.00		QP	VERTICAL
2	37.42	14.38	12.87	3.74	30.99	40.00	-9.01	QP	VERTICAL
3	102.36	14.18	11.72	4.22	30.12	43.50	-13.38	QP	VERTICAL
4	148.44	21.16	8.45	4.50	34.11	43.50	-9.39	QP	VERTICAL
5	224.52	13.62	12.14	4.90	30.66	46.00	-15.34	QP	VERTICAL
6	397.63	7.89	15.57	5.50	28.96	46.00	-17.04	QP	VERTICAL
7	522.72	13.85	17.44	5.89	37.18	46.00	-8.82	QP	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Site	: DDT 3m Chamber 1#	D:\2019 RE1# Report Data\Q19080513-1E Bar9.1\FCC BELOW1G.EM6	
Test Date	: 2019-11-03	**Tested By**	: Jacky
EUT	: SOUNDBAR	**Model Number**	: BAR 9.1 CNTR
Power Supply	: AC 120 V/ 60Hz	**Test Mode**	: Tx mode
Condition	: Temp:24.5'C,Humi:55%,Press:101.4kPa	**Antenna/Distance**	: 2018 VULB 9163 1#/3m/HORIZONTAL
Memo	: BAR 5.8G		

Data: 10



Item (Mark)	Freq. (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	Cable Loss dB	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	50.76	3.41	14.33	3.88	21.62	40.00	-18.38	QP	HORIZONTAL
2	107.13	8.75	11.77	4.24	24.76	43.50	-18.74	QP	HORIZONTAL
3	224.52	24.20	12.14	4.90	41.24	46.00	-4.76	QP	HORIZONTAL
4	319.94	13.85	14.36	5.26	33.47	46.00	-12.53	QP	HORIZONTAL
5	627.27	2.11	18.96	6.17	27.24	46.00	-18.76	QP	HORIZONTAL
6	890.73	7.12	21.61	6.87	35.60	46.00	-10.40	QP	HORIZONTAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

Radiated Emission test (above 1GHz)

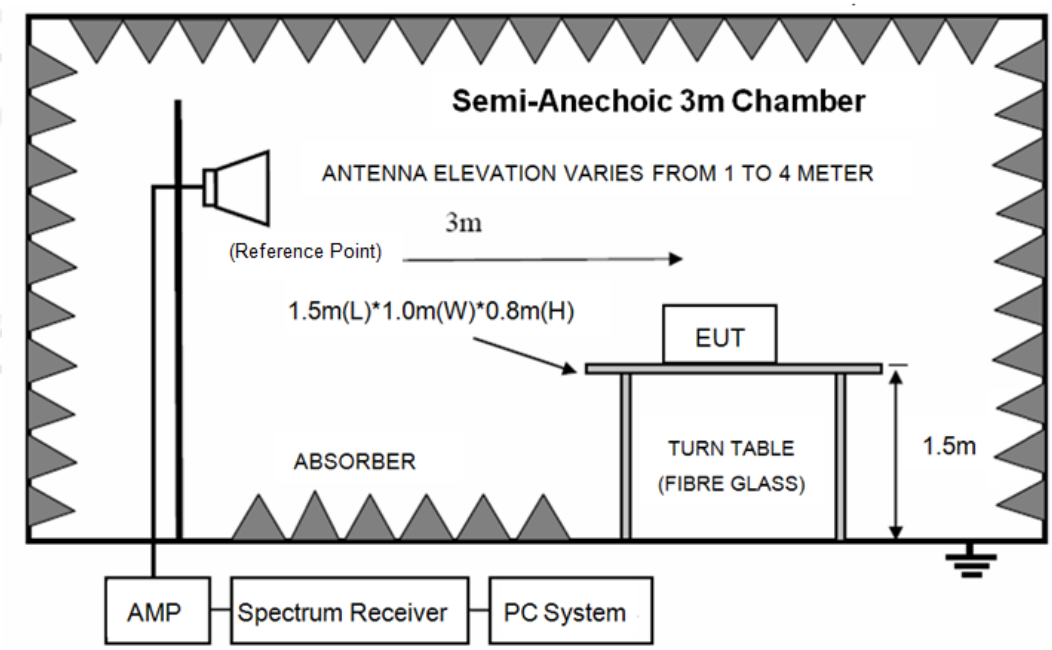
Freq (MHz)	Read level (dBµV)	Antenna Factor (dB/m)	PRM Factor(dB)	Cable Loss (dB)	Result Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector type	Polarization
5180 MHz									
4026.00	46.78	32.94	44.24	5.29	40.77	74.00	-33.23	Peak	HORIZONTAL
5896.00	45.66	34.62	43.14	6.50	43.64	74.00	-30.36	Peak	HORIZONTAL
8514.00	44.54	36.80	42.16	7.64	46.82	74.00	-27.18	Peak	HORIZONTAL
10360.00	48.72	37.62	42.75	8.83	52.42	74.00	-21.58	Peak	HORIZONTAL
10360.00	46.01	37.62	42.75	8.83	49.71	54.00	-4.29	Average	HORIZONTAL
11744.00	46.56	38.30	42.60	9.07	51.33	74.00	-22.67	Peak	HORIZONTAL
13376.00	45.45	38.83	42.42	10.86	52.72	74.00	-21.28	Peak	HORIZONTAL
4774.00	45.90	33.77	43.86	5.51	41.32	74.00	-32.68	Peak	VERTICAL
6474.00	45.40	35.27	43.04	6.40	44.03	74.00	-29.97	Peak	VERTICAL
8446.00	44.50	36.75	42.27	7.60	46.58	74.00	-27.42	Peak	VERTICAL
10350.00	46.99	37.61	42.76	8.83	50.67	74.00	-23.33	Peak	VERTICAL
12050.00	46.96	38.01	42.70	9.18	51.45	74.00	-22.55	Peak	VERTICAL
13495.00	45.45	38.99	42.30	10.90	53.04	74.00	-20.96	Peak	VERTICAL
5210 MHz									
5335.00	45.84	34.17	43.36	5.93	42.58	74.00	-31.42	Peak	HORIZONTAL
8004.00	46.12	36.30	43.15	7.34	46.61	74.00	-27.39	Peak	HORIZONTAL
9721.00	45.54	37.24	43.12	8.51	48.17	74.00	-25.83	Peak	HORIZONTAL
10420.00	47.98	37.65	42.66	8.85	51.82	74.00	-22.18	Peak	HORIZONTAL
10420.00	46.53	37.65	42.66	8.85	50.37	54.00	-3.63	Average	HORIZONTAL
12050.00	46.17	38.01	42.70	9.18	50.66	74.00	-23.34	Peak	HORIZONTAL
13546.00	45.60	39.11	42.24	10.92	53.39	74.00	-20.61	Peak	HORIZONTAL
4621.00	46.66	33.68	43.94	5.47	41.87	74.00	-32.13	Peak	VERTICAL
6219.00	45.65	34.97	43.10	6.51	44.03	74.00	-29.97	Peak	VERTICAL
8259.00	45.71	36.56	42.64	7.49	47.12	74.00	-26.88	Peak	VERTICAL
10420.00	47.94	37.65	42.66	8.85	51.78	74.00	-22.22	Peak	VERTICAL
12050.00	46.20	38.01	42.70	9.18	50.69	74.00	-23.31	Peak	VERTICAL
13529.00	44.85	39.07	42.26	10.92	52.58	74.00	-21.42	Peak	VERTICAL
5240 MHz									
4366.00	47.18	33.42	44.05	5.39	41.94	74.00	-32.06	Peak	HORIZONTAL
5794.00	46.76	34.54	43.13	6.40	44.57	74.00	-29.43	Peak	HORIZONTAL
8616.00	44.35	36.80	42.17	7.70	46.68	74.00	-27.32	Peak	HORIZONTAL
10480.00	46.75	37.69	42.58	8.86	50.72	74.00	-23.28	Peak	HORIZONTAL
10480.00	46.01	37.69	42.58	8.86	49.98	54.00	-4.02	Average	HORIZONTAL
12305.00	46.59	38.06	42.85	9.59	51.39	74.00	-22.61	Peak	HORIZONTAL
13971.00	43.72	40.13	41.79	11.09	53.15	74.00	-20.85	Peak	HORIZONTAL
6406.00	44.93	35.19	43.05	6.43	43.50	74.00	-30.50	Peak	VERTICAL
8820.00	44.28	36.80	42.18	7.82	46.72	74.00	-27.28	Peak	VERTICAL
10480.00	46.98	37.69	42.58	8.86	50.95	74.00	-23.05	Peak	VERTICAL
12050.00	46.61	38.01	42.70	9.18	51.10	74.00	-22.90	Peak	VERTICAL
13189.00	46.06	38.57	42.63	10.78	52.78	74.00	-21.22	Peak	VERTICAL
13920.00	44.42	40.01	41.84	11.07	53.66	74.00	-20.34	Peak	VERTICAL
5736 MHz									

5420.00	44.60	34.24	43.28	6.01	41.57	74.00	-32.43	Peak	HORIZONTAL
7936.00	44.78	36.25	43.18	7.26	45.11	74.00	-28.89	Peak	HORIZONTAL
9789.00	45.08	37.28	43.15	8.57	47.78	74.00	-26.22	Peak	HORIZONTAL
12050.00	45.77	38.01	42.70	9.18	50.26	74.00	-23.74	Peak	HORIZONTAL
13801.00	44.34	39.73	41.97	11.02	53.12	74.00	-20.88	Peak	HORIZONTAL
14702.00	43.62	40.46	41.72	11.18	53.54	74.00	-20.46	Peak	HORIZONTAL
5590.00	44.39	34.37	43.18	6.19	41.77	74.00	-32.23	Peak	VERTICAL
8089.00	44.95	36.39	42.98	7.39	45.75	74.00	-28.25	Peak	VERTICAL
10605.00	44.30	37.66	42.30	8.90	48.56	74.00	-25.44	Peak	VERTICAL
12526.00	45.95	38.11	42.96	9.95	51.05	74.00	-22.95	Peak	VERTICAL
13580.00	44.65	39.19	42.21	10.94	52.57	74.00	-21.43	Peak	VERTICAL
14481.00	43.91	40.30	41.73	11.16	53.64	74.00	-20.36	Peak	VERTICAL
5762 MHz									
4774.00	46.91	33.77	43.86	5.51	42.33	74.00	-31.67	Peak	HORIZONTAL
7409.00	44.65	35.85	43.31	6.64	43.83	74.00	-30.17	Peak	HORIZONTAL
9755.00	45.19	37.26	43.14	8.54	47.85	74.00	-26.15	Peak	HORIZONTAL
11251.00	44.99	38.06	41.95	9.03	50.13	74.00	-23.87	Peak	HORIZONTAL
13070.00	46.18	38.40	42.75	10.74	52.57	74.00	-21.43	Peak	HORIZONTAL
13920.00	44.20	40.01	41.84	11.07	53.44	74.00	-20.56	Peak	HORIZONTAL
6304.00	44.20	35.07	43.08	6.47	42.66	74.00	-31.34	Peak	VERTICAL
8854.00	43.72	36.80	42.18	7.84	46.18	74.00	-27.82	Peak	VERTICAL
11200.00	45.11	37.95	41.83	9.02	50.25	74.00	-23.75	Peak	VERTICAL
12050.00	46.50	38.01	42.70	9.18	50.99	74.00	-23.01	Peak	VERTICAL
13410.00	45.79	38.88	42.39	10.87	53.15	74.00	-20.85	Peak	VERTICAL
14379.00	44.06	40.28	41.74	11.15	53.75	74.00	-20.25	Peak	VERTICAL
5814 MHz									
6406.00	44.59	35.19	43.05	6.43	43.16	74.00	-30.84	Peak	HORIZONTAL
9160.00	43.90	36.90	42.46	8.05	46.39	74.00	-27.61	Peak	HORIZONTAL
10911.00	45.10	37.53	41.57	8.98	50.04	74.00	-23.96	Peak	HORIZONTAL
13070.00	44.72	38.40	42.75	10.74	51.11	74.00	-22.89	Peak	HORIZONTAL
14090.00	43.84	40.22	41.75	11.11	53.42	74.00	-20.58	Peak	HORIZONTAL
16045.00	44.25	41.27	42.54	10.25	53.23	74.00	-20.77	Peak	HORIZONTAL
5590.00	45.54	34.37	43.18	6.19	42.92	74.00	-31.08	Peak	VERTICAL
8089.00	45.29	36.39	42.98	7.39	46.09	74.00	-27.91	Peak	VERTICAL
10520.00	44.13	37.69	42.50	8.88	48.20	74.00	-25.80	Peak	VERTICAL
12050.00	46.31	38.01	42.70	9.18	50.80	74.00	-23.20	Peak	VERTICAL
14294.00	43.80	40.26	41.74	11.14	53.46	74.00	-20.54	Peak	VERTICAL
16351.00	43.10	41.76	42.43	10.42	52.85	74.00	-21.15	Peak	VERTICAL

Note:1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.
3. Scan with ANT A and ANT B, only ANT A mode is the worst case and reported.

9. Band Edge Compliance

9.1. Block diagram of test setup



9.2. Limit

For transmitters operating in the 5.15-5.25 GHz and 5.725-5.85 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz.

-27 dBm/MHz Limit=95.2+EIRP[dBm]=95.2-27=68.2 dBμV/m

9.3. Test Procedure

Same with clause 8.3 except change investigated frequency range.

Remark: All restriction band have been tested, and only the worst case is shown in report.

9.4. Test result

PASS. (See below detailed test result)

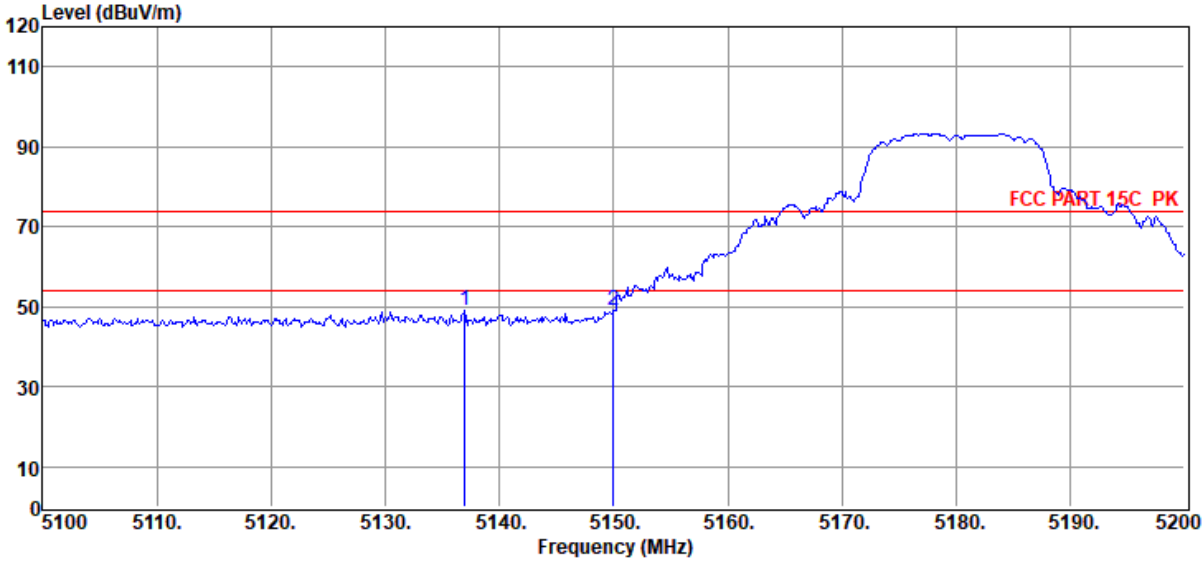
Note1: As specified in 15.407(b), emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit of -27 dBm/MHz (or -17 dBm/MHz as specified in 15.407(b)(4)). However, an out-of-band emission that complies with both the average and peak limits of 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz peak emission limit

Note2: ANT A and ANT B mode all have been tested, only ANT A mode is the worst case and reported.

TR-4-E-009 Radiated Emission Test Result

Test Site	: DDT 3m Chamber 1#	D:\2019 RE1# Report Data\Q19080513-1E Bar9.1\FCC ABOVE 1G 20191206.EM6	
Test Date	: 2019-12-07	**Tested By**	: Jacky
EUT	: SOUNDBAR	**Model Number**	: BAR 9.1 CNTR
Power Supply	: AC 230V/50Hz	**Test Mode**	: Tx mode
Condition	: Temp:24.5'C,Humi:55%,Press:100.1kPa	**Antenna/Distance**	: 2018 HF 907/3m/HORIZONTAL
Memo	: 5.2G 5180 BAR ANTA		

Data: 367



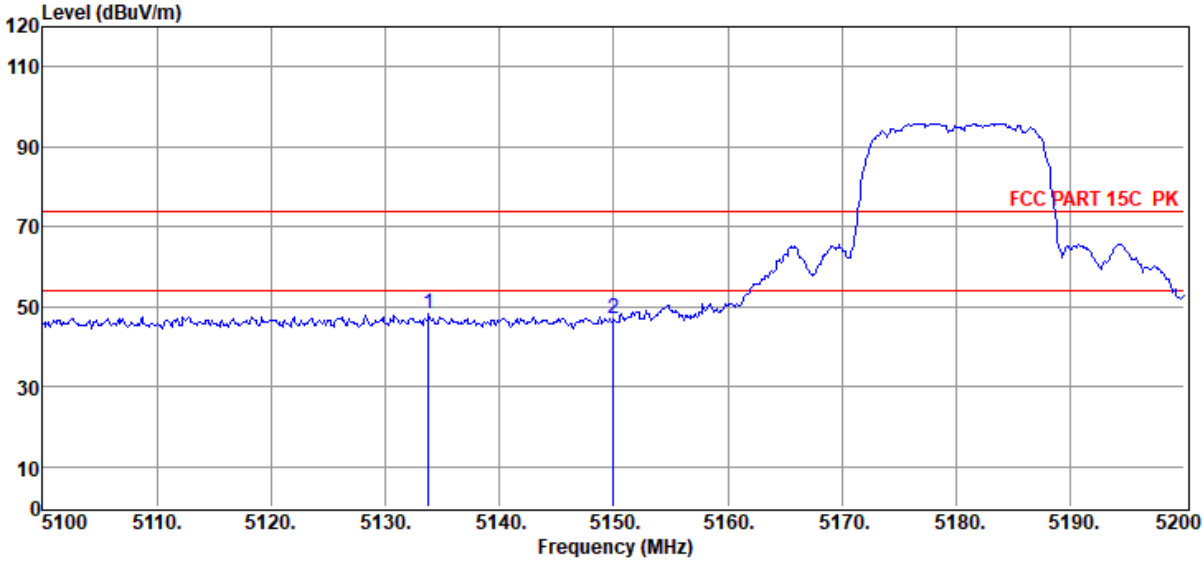
Item (Mark)	Freq. (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	5137.00	52.69	34.01	43.54	5.72	48.88	74.00	-25.12	Peak	HORIZONTAL
2	5150.00	52.79	34.02	43.53	5.73	49.01	74.00	-24.99	Peak	HORIZONTAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Site	: DDT 3m Chamber 1#	D:\2019 RE1# Report Data\Q19080513-1E Bar9.1\FCC ABOVE 1G 20191206.EM6	
Test Date	: 2019-12-07	**Tested By**	: Jacky
EUT	: SOUNDBAR	**Model Number**	: BAR 9.1 CNTR
Power Supply	: AC 230V/50Hz	**Test Mode**	: Tx mode
Condition	: Temp:24.5'C,Humi:55%,Press:100.1kPa	**Antenna/Distance**	: 2018 HF 907/3m/VERTICAL
Memo	: 5.2G 5180 BAR ANTA		

Data: 368



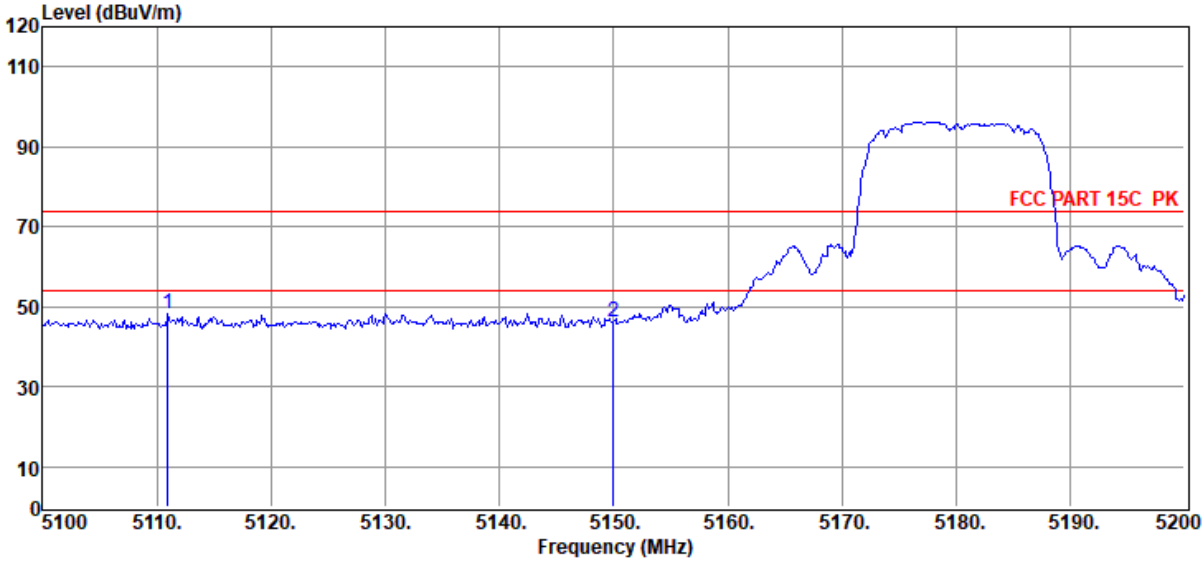
Item (Mark)	Freq. (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	5133.80	52.04	34.01	43.55	5.72	48.22	74.00	-25.78	Peak	VERTICAL
2	5150.00	50.94	34.02	43.53	5.73	47.16	74.00	-26.84	Peak	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Site	: DDT 3m Chamber 1#	D:\2019 RE1# Report Data\Q19080513-1E Bar9.1\FCC ABOVE 1G 20191206.EM6	
Test Date	: 2019-12-07	**Tested By**	: Jacky
EUT	: SOUNDBAR	**Model Number**	: BAR 9.1 CNTR
Power Supply	: AC 230V/50Hz	**Test Mode**	: Tx mode
Condition	: Temp:24.5'C,Humi:55%,Press:100.1kPa	**Antenna/Distance**	: 2018 HF 907/3m/VERTICAL
Memo	: 5.2G 5180 BAR ANTB		

Data: 369



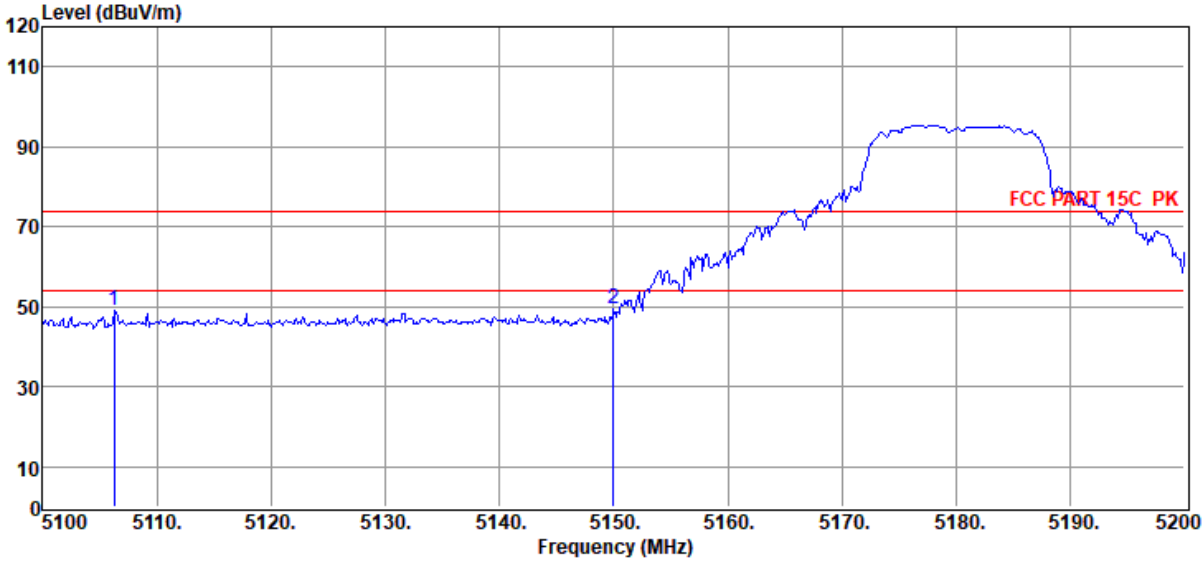
Item (Mark)	Freq. (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	5111.00	52.14	33.99	43.57	5.69	48.25	74.00	-25.75	Peak	VERTICAL
2	5150.00	49.93	34.02	43.53	5.73	46.15	74.00	-27.85	Peak	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Site	: DDT 3m Chamber 1#	D:\2019 RE1# Report Data\Q19080513-1E Bar9.1\FCC ABOVE 1G 20191206.EM6	
Test Date	: 2019-12-07	**Tested By**	: Jacky
EUT	: SOUNDBAR	**Model Number**	: BAR 9.1 CNTR
Power Supply	: AC 230V/50Hz	**Test Mode**	: Tx mode
Condition	: Temp:24.5'C,Humi:55%,Press:100.1kPa	**Antenna/Distance**	: 2018 HF 907/3m/HORIZONTAL
Memo	: 5.2G 5180 BAR ANTB		

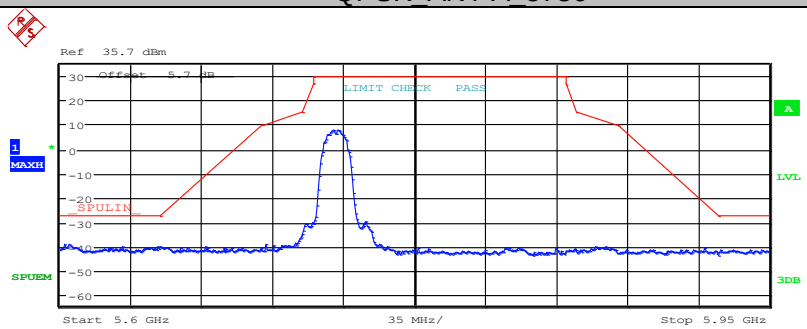
Data: 370



Item (Mark)	Freq. (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	5106.30	52.90	33.99	43.57	5.69	49.01	74.00	-24.99	Peak	HORIZONTAL
2	5150.00	53.33	34.02	43.53	5.73	49.55	74.00	-24.45	Peak	HORIZONTAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

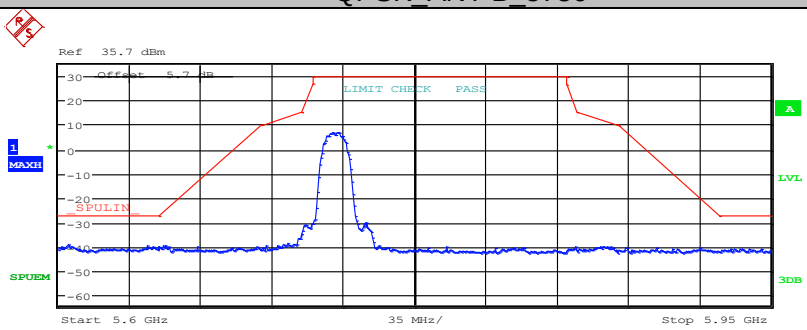
QPSK_ANT A_5736



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
5.600 G	5.650 G	1.00 M	5.602000 G	-39.27	-12.27
5.650 G	5.700 G	1.00 M	5.650000 G	-40.72	-13.72
5.700 G	5.720 G	1.00 M	5.701475 G	-39.40	-49.81
5.720 G	5.725 G	1.00 M	5.720922 G	-31.16	-48.86
5.725 G	5.850 G	1.00 M	5.734531 G	7.72	-22.28
5.850 G	5.855 G	1.00 M	5.854988 G	-41.63	-57.26
5.855 G	5.875 G	1.00 M	5.869300 G	-40.12	-51.71
5.875 G	5.925 G	1.00 M	5.923375 G	-41.59	-15.79
5.925 G	5.950 G	1.00 M	5.946172 G	-41.50	-14.50

Date: 5.NOV.2019 23:05:03

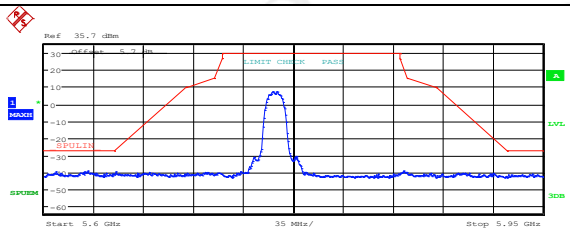
QPSK_ANT B_5736



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
5.600 G	5.650 G	1.00 M	5.605062 G	-39.20	-12.20
5.650 G	5.700 G	1.00 M	5.650062 G	-40.52	-13.57
5.700 G	5.720 G	1.00 M	5.701912 G	-39.67	-50.21
5.720 G	5.725 G	1.00 M	5.720813 G	-31.84	-49.30
5.725 G	5.850 G	1.00 M	5.734531 G	7.04	-22.96
5.850 G	5.855 G	1.00 M	5.854853 G	-41.47	-57.41
5.855 G	5.875 G	1.00 M	5.873050 G	-40.41	-50.96
5.875 G	5.925 G	1.00 M	5.924750 G	-42.22	-15.41
5.925 G	5.950 G	1.00 M	5.934938 G	-41.06	-14.06

Date: 5.NOV.2019 23:04:15

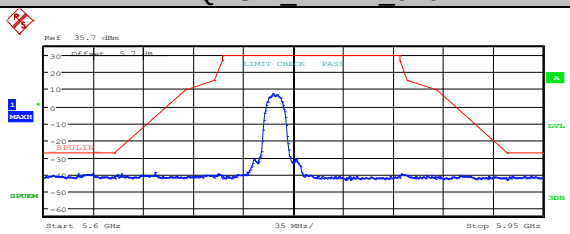
QPSK _ANT A_5762



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
5.600 G	5.650 G	1.00 M	5.631062 G	-39.11	-12.11
5.650 G	5.700 G	1.00 M	5.650344 G	-39.70	-12.95
5.700 G	5.720 G	1.00 M	5.700125 G	-40.60	-50.64
5.720 G	5.725 G	1.00 M	5.720000 G	-41.62	-57.22
5.725 G	5.850 G	1.00 M	5.760547 G	7.30	-22.70
5.850 G	5.855 G	1.00 M	5.854825 G	-40.41	-56.41
5.855 G	5.875 G	1.00 M	5.871512 G	-40.39	-51.37
5.875 G	5.925 G	1.00 M	5.924844 G	-42.34	-15.45
5.925 G	5.950 G	1.00 M	5.942859 G	-41.14	-14.14

Date: 5.NOV.2019 23:05:49

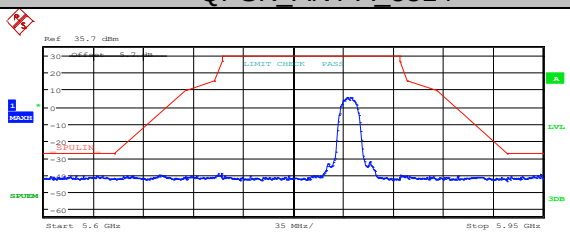
QPSK _ANT B_5762



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
5.600 G	5.650 G	1.00 M	5.624031 G	-39.64	-12.64
5.650 G	5.700 G	1.00 M	5.650688 G	-40.94	-14.45
5.700 G	5.720 G	1.00 M	5.701075 G	-41.20	-51.50
5.720 G	5.725 G	1.00 M	5.720053 G	-41.15	-56.87
5.725 G	5.850 G	1.00 M	5.760547 G	7.11	-22.89
5.850 G	5.855 G	1.00 M	5.854928 G	-41.43	-57.19
5.855 G	5.875 G	1.00 M	5.872088 G	-40.72	-51.54
5.875 G	5.925 G	1.00 M	5.924844 G	-42.35	-15.46
5.925 G	5.950 G	1.00 M	5.942125 G	-40.82	-13.82

Date: 5.NOV.2019 23:06:55

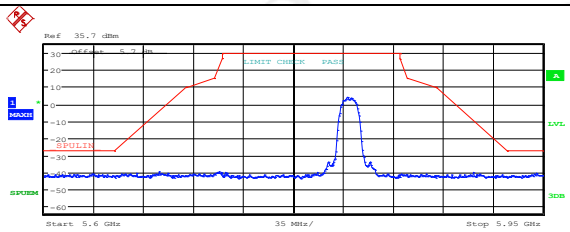
QPSK_ANT A_5814



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
5.600 G	5.650 G	1.00 M	5.641125 G	-40.44	-13.44
5.650 G	5.700 G	1.00 M	5.650000 G	-42.68	-15.68
5.700 G	5.720 G	1.00 M	5.703125 G	-40.46	-51.34
5.720 G	5.725 G	1.00 M	5.720006 G	-41.63	-57.25
5.725 G	5.850 G	1.00 M	5.812656 G	5.50	-24.50
5.850 G	5.855 G	1.00 M	5.854944 G	-41.78	-57.51
5.855 G	5.875 G	1.00 M	5.873337 G	-41.10	-51.56
5.875 G	5.925 G	1.00 M	5.924156 G	-42.44	-16.06
5.925 G	5.950 G	1.00 M	5.948328 G	-39.48	-12.48

Date: 5.NOV.2019 23:08:05

QPSK_ANT B_5814

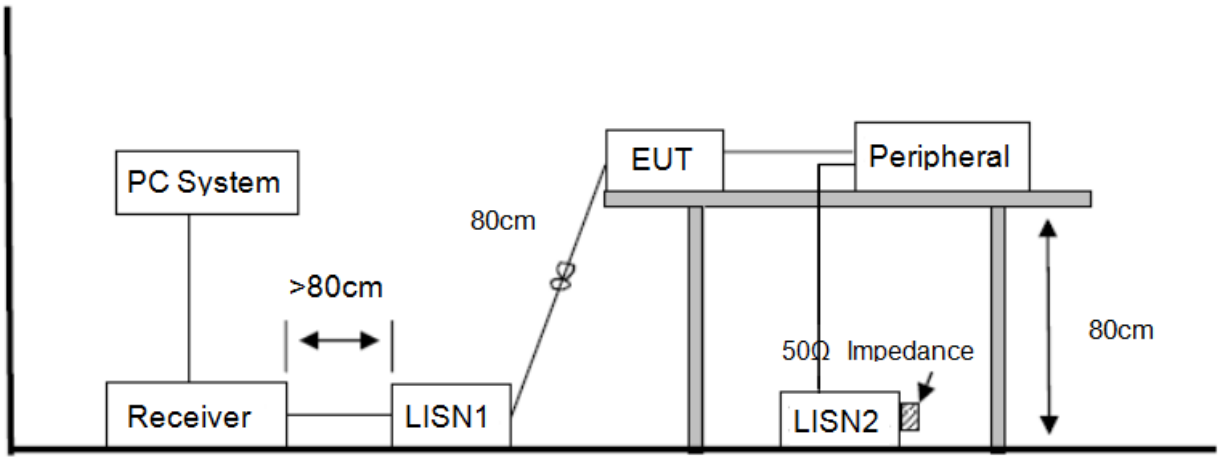


Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
5.600 G	5.650 G	1.00 M	5.633687 G	-41.03	-14.03
5.650 G	5.700 G	1.00 M	5.650313 G	-41.91	-15.14
5.700 G	5.720 G	1.00 M	5.702650 G	-41.35	-52.09
5.720 G	5.725 G	1.00 M	5.720353 G	-40.89	-57.30
5.725 G	5.850 G	1.00 M	5.812656 G	3.92	-26.08
5.850 G	5.855 G	1.00 M	5.854825 G	-41.66	-57.66
5.855 G	5.875 G	1.00 M	5.874800 G	-41.86	-51.91
5.875 G	5.925 G	1.00 M	5.924281 G	-42.54	-16.08
5.925 G	5.950 G	1.00 M	5.945609 G	-40.82	-13.82

Date: 5.NOV.2019 23:10:14

10. Power Line Conducted Emission

10.1. Block diagram of test setup



10.2. Power Line Conducted Emission Limits (Class B)

Frequency	Quasi-Peak Level dB(μV)	Average Level dB(μV)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Note 1: * Decreasing linearly with logarithm of frequency.

Note 2: The lower limit shall apply at the transition frequencies.

10.3. Test Procedure

The EUT and Support equipment, if needed, were put placed on a non-metallic table, 80cm above the ground plane.

Configuration EUT to simulate typical usage as described in clause 2.3 and test equipment as described in clause 10.2 of this report.

All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.

All support equipment power received from a second LISN.

Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.

The Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.

During the above scans, the emissions were maximized by cable manipulation.

The test mode(s) described in clause 2.3 were scanned during the preliminary test.

After the preliminary scan, we found the test mode producing the highest emission level.

The EUT configuration and worse cable configuration of the above highest emission levels were recorded for reference of the final test.
EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test.

A scan was taken on both power lines, Neutral and Line, recording at least the six highest emissions.

Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.

The test data of the worst-case condition(s) was recorded.

The bandwidth of test receiver is set at 9 kHz.

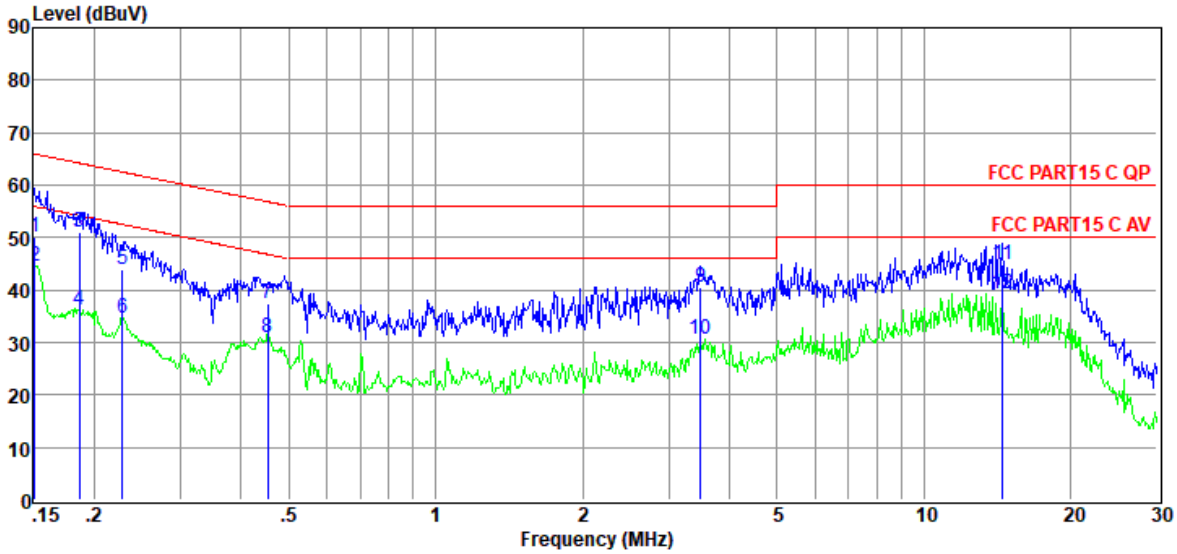
10.4. Test Result

PASS. (See below detailed test result)

Note1: All emissions not reported below are too low against the prescribed limits.
Note2: "-----" means peak detection; "-----" means average detection
Note3: Pre-test AC conducted emission at both voltage AC 120V/60Hz and AC 240V/50Hz, recorded worse case.

TR-4-E-010 Conducted Emission Test Result

	: DDT 1# Shield Room		D:\2019 CE report data\Q19080513-1E\20191104 CE.EM6
Test Date	: 2019-11-05	**Tested By**	: Huang
EUT	: SOUNDBAR	**Model Number**	: BAR 9.1 CNTR
Power Supply	: AC 240V/50Hz	**Test Mode**	: Tx mode
Condition	: Temp:24.5'C,Humi:61.5%,Press:101.4kPa	**LISN**	: 2018 ENV216/LINE

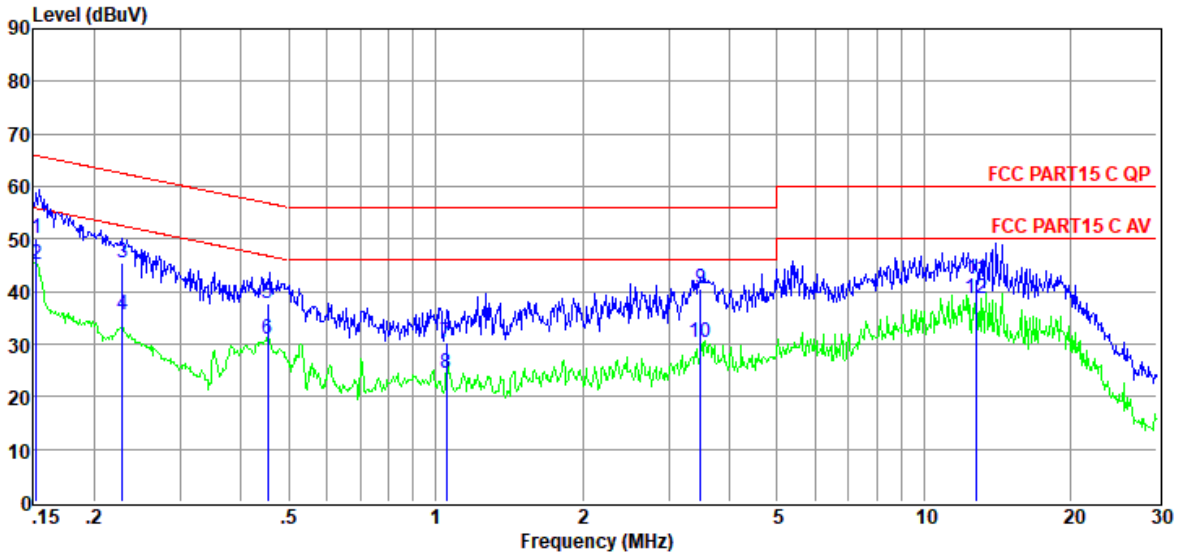


Item (Mark)	Freq. (MHz)	Read Level (dBµV)	LISN Factor (dB)	Cable Loss (dB)	Pulse Limiter Factor (dB)	Result Level (dBµV)	Limit Line (dBµV)	Over Limit (dB)	Detector	Phase
1	0.15	30.48	9.63	0.02	9.86	49.99	65.96	-15.97	QP	LINE
2	0.15	25.02	9.63	0.02	9.86	44.53	55.96	-11.43	Average	LINE
3	0.19	31.54	9.63	0.02	9.86	51.05	64.20	-13.15	QP	LINE
4	0.19	16.69	9.63	0.02	9.86	36.20	54.20	-18.00	Average	LINE
5	0.23	24.38	9.63	0.02	9.86	43.89	62.52	-18.63	QP	LINE
6	0.23	15.10	9.63	0.02	9.86	34.61	52.52	-17.91	Average	LINE
7	0.45	18.04	9.64	0.02	9.86	37.56	56.80	-19.24	QP	LINE
8	0.45	11.35	9.64	0.02	9.86	30.87	46.80	-15.93	Average	LINE
9	3.49	21.05	9.68	0.05	9.87	40.65	56.00	-15.35	QP	LINE
10	3.49	11.14	9.68	0.05	9.87	30.74	46.00	-15.26	Average	LINE
11	14.50	24.79	10.18	0.05	9.93	44.95	60.00	-15.05	QP	LINE
12	14.50	19.13	10.18	0.05	9.93	39.29	50.00	-10.71	Average	LINE

Note: 1. Result Level = Read Level +LISN Factor + Pulse Limiter Factor + Cable loss.
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).
4. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.

TR-4-E-010 Conducted Emission Test Result

Test Site	: DDT 1# Shield Room	D:\2019 CE report data\Q19080513-1E\20191104 CE.EM6	
Test Date	: 2019-11-05	**Tested By**	: Huang
EUT	: SOUNDBAR	**Model Number**	: BAR 9.1 CNTR
Power Supply	: AC 240V/50Hz	**Test Mode**	: Tx mode
Condition	: Temp:24.5'C,Humi:61.5%,Press:101.4kPa	**LISN**	: 2018 ENV216/NEUTRAL



Item (Mark)	Freq. (MHz)	Read Level (dBµV)	LISN Factor (dB)	Cable Loss (dB)	Pulse Limiter Factor (dB)	Result Level (dBµV)	Limit Line (dBµV)	Over Limit (dB)	Detector	Phase
1	0.15	30.64	9.64	0.02	9.86	50.16	65.87	-15.71	QP	NEUTRAL
2	0.15	25.65	9.64	0.02	9.86	45.17	55.87	-10.70	Average	NEUTRAL
3	0.23	25.90	9.64	0.02	9.86	45.42	62.52	-17.10	QP	NEUTRAL
4	0.23	16.04	9.64	0.02	9.86	35.56	52.52	-16.96	Average	NEUTRAL
5	0.45	18.20	9.64	0.02	9.86	37.72	56.80	-19.08	QP	NEUTRAL
6	0.45	11.45	9.64	0.02	9.86	30.97	46.80	-15.83	Average	NEUTRAL
7	1.05	10.74	9.64	0.10	9.87	30.35	56.00	-25.65	QP	NEUTRAL
8	1.05	4.88	9.64	0.10	9.87	24.49	46.00	-21.51	Average	NEUTRAL
9	3.49	20.91	9.69	0.05	9.87	40.52	56.00	-15.48	QP	NEUTRAL
10	3.49	10.69	9.69	0.05	9.87	30.30	46.00	-15.70	Average	NEUTRAL
11	12.80	22.13	10.12	0.10	9.92	42.27	60.00	-17.73	QP	NEUTRAL
12	12.80	18.54	10.12	0.10	9.92	38.68	50.00	-11.32	Average	NEUTRAL

Note: 1. Result Level = Read Level +LISN Factor + Pulse Limiter Factor + Cable loss.
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).
4. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.

11. Antenna Requirements

11.1. Limit

For intentional device, according to FCC 47 CFR Section 15.203, 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. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

11.2. Result

There are two antennas used for this product, both are integrated antenna and no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain is 3.2 dBi of both antennas.

END OF REPORT