

TEST REPORT

of

FCC Part 15 Subpart E §15.407
IC RSS-247 Issue 2 and RSS-Gen Issue 5

FCC ID: YZP-ATC5CPL004
IC Certification: 7414C-ATC5CPL004

Equipment Under Test : BT/WIFI Combo Module

Model Name : ATC5CPL004

Variant Model Name(s) : -

FCC Applicant : LG Innotek Co., Ltd.

IC Applicant : LG Innotek Co., Ltd.

Manufacturer : LG Innotek Co., Ltd.

Date of Receipt : 2023.03.14

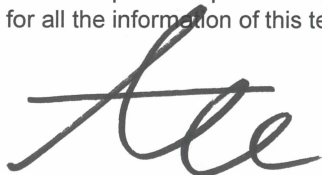
Date of Test(s) : 2023.03.14 ~ 2023.04.24

Date of Issue : 2023.04.24

In the configuration tested, the EUT complied with the standards specified above. This test report does not assure KOLAS accreditation.

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- 2) The SGS Korea is not responsible for the sampling, the results of this test report apply to the sample as received.
- 3) This test report cannot be reproduced, except in full, without prior written permission of the Company.
- 4) The data marked ※ in this report was provided by the customer and may affect the validity of the test results.
We are responsible for all the information of this test report except for the data(※) provided by the customer.

Tested by:



Teo Kim

Technical
Manager:



Jinhyoung Cho

SGS Korea Co., Ltd. Gunpo Laboratory

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1. General Information

1.1. Testing Laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)

- 10-2, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807
- 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807
- Designation number: KR0150

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Phone No. : +82 31 688 0901

Fax No. : +82 31 688 0921

1.2. Details of Applicant

FCC Applicant : LG Innotek Co., Ltd.

FCC Address : 26, Hanamsandan 5beon-ro, Gwangsan-gu, Gwangju, South Korea, 506-731

IC Applicant : LG Innotek Co., Ltd.

IC Address : 26, Hanamsandan 5beon-ro, Gwangsan-gu, Gwangju, Korea (Republic Of), 506-731

Contact Person : Jeong, In-chang

Phone No. : +82 62 950 0332

1.3. Details of Manufacturer

Company : LG Innotek Co., Ltd.

Address : 30, Magokjungang 10-ro, Gangseo-gu, Seoul, Korea, 07796

1.4. Description of EUT

Kind of Product		BT/WIFI Combo Module
Model Name		ATC5CPL004
Variant Model Name		-
Serial Number		Conducted: C-001 Radiated: N-001
Power Supply		DC 3.3 V
Frequency Range		5 180 MHz ~ 5 240 MHz (Band 1: 11a/n_HT20, 11ac_VHT20) 5 190 MHz ~ 5 230 MHz (Band 1: 11n_HT40, 11ac_VHT40) 5 210 MHz (Band 1: 11ac_VHT80) 5 260 MHz ~ 5 320 MHz (Band 2A: 11a/n_HT20, 11ac_VHT20) 5 270 MHz ~ 5 310 MHz (Band 2A: 11n_HT40, 11ac_VHT40) 5 290 MHz (Band 2A: 11ac_VHT80) 5 500 MHz ~ 5 720 MHz (Band 2C: 11a/n_HT20, 11ac_VHT20) 5 510 MHz ~ 5 710 MHz (Band 2C: 11n_HT40, 11ac_VHT40) 5 530 MHz ~ 5 690 MHz (Band 2C: 11ac_VHT80) 5 745 MHz ~ 5 825 MHz (Band 3: 11a/n_HT20, 11ac_VHT20) 5 755 MHz ~ 5 795 MHz (Band 3: 11n_HT40, 11ac_VHT40) 5 775 MHz (Band 3: 11ac_VHT80)
Modulation Technique		OFDM
Number of Channels		4 channels (Band 1: 11a/n_HT20, 11ac_VHT20) 2 channels (Band 1: 11n_HT40, 11ac_VHT40) 1 channel (Band 1: 11ac_VHT80) 4 channels (Band 2A: 11a/n_HT20, 11ac_VHT20) 2 channels (Band 2A: 11n_HT40, 11ac_VHT40) 1 channel (Band 2A: 11ac_VHT80) 9 channels (Band 2C: 11a/n_HT20, 11ac_VHT20) 4 channels (Band 2C: 11n_HT40, 11ac_VHT40) 2 channels (Band 2C: 11ac_VHT80) 5 channels (Band 3: 11a/n_HT20, 11ac_VHT20) 2 channels (Band 3: 11n_HT40, 11ac_VHT40) 1 channel (Band 3: 11ac_VHT80)
Antenna Type		Pattern antenna
Antenna Gain ※	Core 0	5 150 MHz ~ 5 250 MHz: 1.68 dB i 5 250 MHz ~ 5 350 MHz: 1.68 dB i 5 470 MHz ~ 5 725 MHz: 2.38 dB i 5 725 MHz ~ 5 850 MHz: 3.04 dB i
	Core 1	5 150 MHz ~ 5 250 MHz: 1.90 dB i 5 250 MHz ~ 5 350 MHz: 2.92 dB i 5 470 MHz ~ 5 725 MHz: 3.55 dB i 5 725 MHz ~ 5 850 MHz: 3.32 dB i
H/W Version		1.0
S/W Version		1.0
FVIN		N/A

1.5. Declaration by the Manufacturer

- The EUT is a slave without radar detection and TPC.
- The EUT is not supported TDWR(5.6 - 5.65 GHz) band.
- WLAN 5 GHz transmits on both Core 0 and Core 1.

1.6. Device Capabilities

Frequency	Mode	SISO		MIMO
		Core 0	Core 1	Core 0 + Core 1
2.4 GHz	Bluetooth & Bluetooth Low Energy	O	X	X
	802.11b/g/n	X	O	X
5 GHz	802.11a	O	O	X
	802.11n/ac	O	O	O

1.7. Automatically Discontinue Transmission

1.7.1. Limit of Automatically Discontinue Transmission

The device shall automatically discontinue transmission in case of either absence of information to transmit or operating failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization to describe how this requirement is met.

1.7.2. Test Result of Automatically Discontinue Transmission

While the EUT is not transmitting any information, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling signal of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission.

1.8. Test Equipment List

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Interval	Cal. Due
Signal Generator	R&S	SMA100B	106887	Oct. 13, 2022	Annual	Oct. 13, 2023
Signal Generator	R&S	SMBV100A	255834	May 25, 2022	Annual	May 25, 2023
Spectrum Analyzer	R&S	FSV30	103210	Dec. 07, 2022	Annual	Dec. 07, 2023
Spectrum Analyzer	Agilent	N9020A	MY53421758	Aug. 26, 2022	Annual	Aug. 26, 2023
Spectrum Analyzer	Agilent	N9030A	US51350132	Nov. 11, 2022	Annual	Nov. 11, 2023
Power Meter	Anritsu	ML2495A	1223004	Nov. 29, 2022	Annual	Nov. 29, 2023
Power Sensor	Anritsu	MA2411B	1207272	May 27, 2022	Annual	May 27, 2023
Attenuator	AEROFLEX / INMET	40AH2W-10	40G-1	Jun. 08, 2022	Annual	Jun. 08, 2023
Low Pass Filter	Mini-Circuits	NLP-1200+	V 8979400903-2	Feb. 09, 2023	Annual	Feb. 09, 2024
Low Pass Filter	WT MICROWAVE INC	WT-A1700-LS	WT151207001	Apr. 05, 2023	Annual	Apr. 05, 2024
High Pass Filter	Wainwright Instrument GmbH	WHKX6.0/18G-10SS	51	Jun. 15, 2022	Annual	Jun. 15, 2023
High Pass Filter	Wainwright Instrument GmbH	WHNX7.5/26.5G-6SS	15	May 31, 2022	Annual	May 31, 2023
DC Power Supply	Agilent	U8002A	MY54110041	Sep. 15, 2022	Annual	Sep. 15, 2023
Preamplifier	H.P.	8447F	2944A03909	Aug. 04, 2022	Annual	Aug. 04, 2023
Signal Conditioning Unit	R&S	SCU-18	10117	Jun. 13, 2022	Annual	Jun. 13, 2023
Preamplifier	TESTEK	TK-PA1840H	130016	Jan. 11, 2023	Annual	Jan. 11, 2024
Loop Antenna	Schwarzbeck Mess-Elektronik	FMZB 1519	1519-039	Aug. 23, 2021	Biennial	Aug. 23, 2023
Bilog Antenna	Schwarzbeck Mess-Elektronik	VULB 9163	01126	Feb. 09, 2023	Annual	Feb. 09, 2024
Horn Antenna	R&S	HF906	100326	Feb. 28, 2023	Annual	Feb. 28, 2024
Horn Antenna	Schwarzbeck Mess-Elektronik	BBHA 9170	9170-540	Nov. 30, 2022	Annual	Nov. 30, 2023
EMI Test Receiver	R&S	ESU26	100109	Jan. 18, 2023	Annual	Jan. 18, 2024
Turn Table	Innco systems GmbH	DS 1200 S	N/A	N.C.R.	N/A	N.C.R.
Controller	Innco systems GmbH	CONTROLLER CO3000-4P	CO3000/963/3 8330516/L	N.C.R.	N/A	N.C.R.
Antenna Mast	Innco systems GmbH	MA4640-XP-ET	MA4640/536/3 8330516/L	N.C.R.	N/A	N.C.R.
Anechoic Chamber	SY Corporation	L × W × H (9.6 m × 6.4 m × 6.6 m)	N/A	N.C.R.	N/A	N.C.R.
Coaxial Cable	RFONE	MWX221-NMSNMS (4 m)	J1023142	Apr. 04, 2023	Semi-Annual	Oct. 04, 2023
Coaxial Cable	Qualwave Inc.	QA500-18-NN-10 (10 m)	22200114	Apr. 04, 2023	Semi-Annual	Oct. 04, 2023
Coaxial Cable	RFONE	PL360P-292M292M-1.5M-A	20200324002	Feb. 18, 2023	Semi-Annual	Aug. 18, 2023
Test Receiver	R&S	ESCI 7	100911	Feb. 24, 2023	Annual	Feb. 24, 2024
Two-Line V-Network	R&S	ENV216	100190	May 13, 2022	Annual	May 13, 2023
Shield Room	SY Corporation	L × W × H (6.5 m × 3.5 m × 3.5 m)	N/A	N.C.R.	N/A	N.C.R.

1.9. Summary of Test Result

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15 Subpart E, IC RSS-247 Issue 2, RSS-Gen Issue 5			
Section in FCC	Section in IC	Test Item(s)	Result
15.205(a) 15.209(a) 15.407(b)(1) 15.407(b)(2) 15.407(b)(3) 15.407(b)(4)	RSS-Gen Issue 5 8.9 RSS-247 Issue 2 6.2.1.2 RSS-247 Issue 2 6.2.2.2 RSS-247 Issue 2 6.2.3.2 RSS-247 Issue 2 6.2.4.2	Transmitter Radiated Spurious Emissions	Complied
15.407(a)	RSS-Gen Issue 5 6.7	26 dB Bandwidth & 99 % Bandwidth	Complied
15.407(e)	RSS-247 Issue 2 6.2.4.1	6 dB Bandwidth	Complied
15.407(a)(1) 15.407(a)(2) 15.407(a)(3)	RSS-247 Issue 2 6.2.1.1 RSS-247 Issue 2 6.2.2.1 RSS-247 Issue 2 6.2.3.1 RSS-247 Issue 2 6.2.4.1	Maximum Conducted Output Power	Complied
15.407(a)(1) 15.407(a)(2) 15.407(a)(3)	RSS-247 Issue 2 6.2.1.1 RSS-247 Issue 2 6.2.2.1 RSS-247 Issue 2 6.2.3.1 RSS-247 Issue 2 6.2.4.1	Maximum Power Spectral Density	Complied
15.207	RSS-Gen Issue 5 8.8	AC Power Line Conducted Emission	Complied

1.10. Test Report Revision

Revision	Report Number	Date of Issue	Description
0	F690501-RF-RTL004006	2023.04.24	Initial

1.11. Test Procedure(s)

The measurement procedures described in the American National Standard of Procedures for Compliance Testing of unlicensed Wireless Devices (ANSI C63.10-2013) and the guidance provided in KDB 789033 D02 General UNII Test Procedures New Rules v02r01 were used in the measurement of the DUT.

1.12. Sample Calculation

Where relevant, the following sample calculation is provided:

1.12.1. Conducted Test

Offset value (dB) = Attenuator (dB) + Cable loss (dB)

1.12.2. Radiation Test

Field strength level (dB μ V/m) = Measured level (dB μ V) + Antenna factor (dB/m) + Cable loss (dB) - Amplifier gain (dB) + Duty factor (dB)

1.13. Information of software for test

- Using the software of Linux terminal to testing of EUT.

1.14. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Parameter	Uncertainty	
Maximum Conducted Output Power	0.36 dB	
99 % Bandwidth	0.04 MHz	
26 dB Bandwidth	0.04 MHz	
6 dB Bandwidth	0.05 MHz	
Maximum Power Spectral Density	0.65 dB	
AC Power Line Conducted Emission	4.00 dB	
Radiated Emission, 9 kHz to 30 MHz	H	3.40 dB
	V	3.40 dB
Radiated Emission, below 1 GHz	H	4.50 dB
	V	5.10 dB
Radiated Emission, above 1 GHz	H	3.70 dB
	V	3.90 dB

All measurement uncertainty values are shown with a coverage factor $k = 2$ to indicate a 95 % level of confidence

1.15. Worst-Case Configuration and Test Mode

Modulation	Bandwidth	Antenna	Frequency	Mode	Average Power (dBm)
OFDM	20 MHz	Core 0	5 180	11n_HT20	<u>6.47</u>
				11ac_VHT20	6.42
		Core 1		11n_HT20	6.24
				11ac_VHT20	<u>6.26</u>
		MIMO		11n_HT20	<u>1.51</u>
				11ac_VHT20	1.48
	40 MHz	Core 0	5 190	11n_HT40	<u>6.39</u>
				11ac_VHT40	6.18
		Core 1		11n_HT40	<u>6.19</u>
				11ac_VHT40	6.12
		MIMO		11n_HT40	1.47
				11ac_VHT40	<u>1.49</u>

*For duplicate test items among 802.11n_HT20, HT40, 802.11ac_VHT20 and VHT40 mode, the test mode with the highest power level was tested.

Radiated emission below 1 GHz was performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

Radiated emission above 1 GHz was performed with the EUT set to transmit Low/Middle/High Channels.

Conducted tests were performed with the EUT set to transmit Low/Middle/High channels with highest output power.

The test was performed for both SISO and MIMO mode and 802.11a mode is supported only in SISO mode.

SISO_Core 0

802.11a mode:

We found out the test mode with the highest power level after we analyze all the data rates. 9 Mbps data rate among 6 Mbps, 9 Mbps, 12 Mbps, 18 Mbps, 24 Mbps, 36 Mbps, 48 Mbps and 54 Mbps is chosen as worst case.

802.11n_HT20 mode:

We found out the test mode with the highest power level after we analyze all the data rates. MCS2 data rate among MCS0, MCS1, MCS2, MCS3, MCS4, MCS5, MCS6 and MCS7 is chosen as worst case.

802.11n_HT40 mode:

We found out the test mode with the highest power level after we analyze all the data rates. MCS0 data rate among MCS0, MCS1, MCS2, MCS3, MCS4, MCS5, MCS6 and MCS7 is chosen as worst case.

802.11ac_VHT80 mode:

We found out the test mode with the highest power level after we analyze all the data rates. MCS2 data rate among MCS0, MCS1, MCS2, MCS3, MCS4, MCS5, MCS6, MCS7, MCS8 and MCS9 is chosen as worst case.

SISO_Core 1

802.11a mode:

We found out the test mode with the highest power level after we analyze all the data rates. 6 Mbps data rate among 6 Mbps, 9 Mbps, 12 Mbps, 18 Mbps, 24 Mbps, 36 Mbps, 48 Mbps and 54 Mbps is chosen as worst case.

802.11ac_VHT20 mode:

We found out the test mode with the highest power level after we analyze all the data rates. MCS2 data rate among MCS0, MCS1, MCS2, MCS3, MCS4, MCS5, MCS6, MCS7 and MCS8 is chosen as worst case.

802.11n_HT40 mode:

We found out the test mode with the highest power level after we analyze all the data rates. MCS2 data rate among MCS0, MCS1, MCS2, MCS3, MCS4, MCS5, MCS6 and MCS7 is chosen as worst case.

802.11ac_VHT80 mode:

We found out the test mode with the highest power level after we analyze all the data rates. MCS1 data rate among MCS0, MCS1, MCS2, MCS3, MCS4, MCS5, MCS6, MCS7, MCS8 and MCS9 is chosen as worst case.

MIMO

802.11n_HT20 mode:

We found out the test mode with the highest power level after we analyze all the data rates. MCS13 data rate among MCS8, MCS9, MCS10, MCS11, MCS12, MCS13, MCS14 and MCS15 is chosen as worst case.

802.11ac_VHT40 mode:

We found out the test mode with the highest power level after we analyze all the data rates. MCS3 data rate among MCS0, MCS1, MCS2, MCS3, MCS4, MCS5, MCS6, MCS7, MCS8 and MCS9 is chosen as worst case.

802.11ac_VHT80 mode:

We found out the test mode with the highest power level after we analyze all the data rates. MCS6 data rate among MCS0, MCS1, MCS2, MCS3, MCS4, MCS5, MCS6, MCS7, MCS8 and MCS9 is chosen as worst case.

1.16. Duty Cycle of EUT

Regarding to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, II.B, the maximum duty cycles of all modes were investigated and set the spectrum analyzer as below.

Set RBW $\geq$ EBW if possible; otherwise, set RBW to the largest available value, Set VBW $\geq$ RBW.

Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are $> 50/T$ and the number of sweep points across duration T exceeds 100.

- SISO_Core 0

Mode	Data Rate (Mbps)	Duty Cycle (%)	Correction Factor (dB)
11a	9	90.57	0.43
11n_HT20	MCS2	82.46	0.84
11n_HT40	MCS0	86.68	0.62
11ac_VHT80	MCS2	58.68	2.32

- SISO_Core 1

Mode	Data Rate (Mbps)	Duty Cycle (%)	Correction Factor (dB)
11a	6	93.46	0.29
11ac_VHT20	MCS2	82.46	0.84
11n_HT40	MCS2	70.86	1.50
11ac_VHT80	MCS1	64.83	1.88

- MIMO

Mode	Data Rate (Mbps)	Duty Cycle (%)	Correction Factor (dB)
11n_HT20	MCS13	54.87	2.61
11ac_VHT40	MCS3	55.36	2.57
11ac_VHT80	MCS6	39.02	4.09

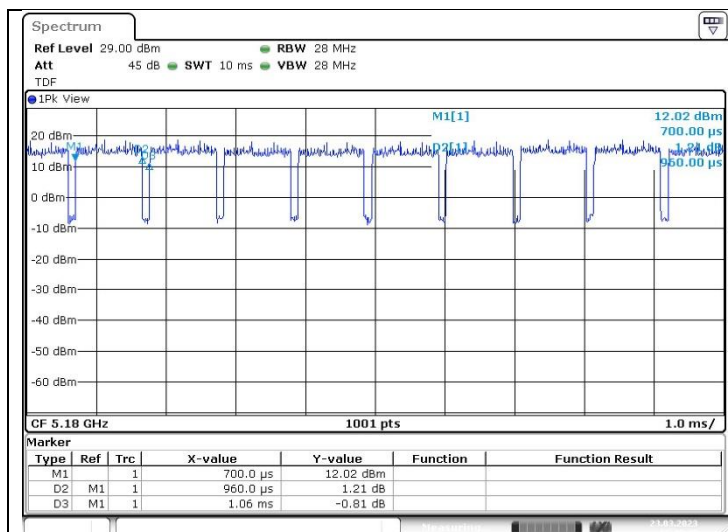
Remark;

- As measured duty cycles of EUT, all of mode and data rate keep constant period and are converted to log scale (power averaging) to compensate correction factor to result of average test items.
- Duty Cycle (%) = (Tx on time / Tx on + off time) x 100
- Correction Factor (dB) = 10 log (1 / Duty Cycle)

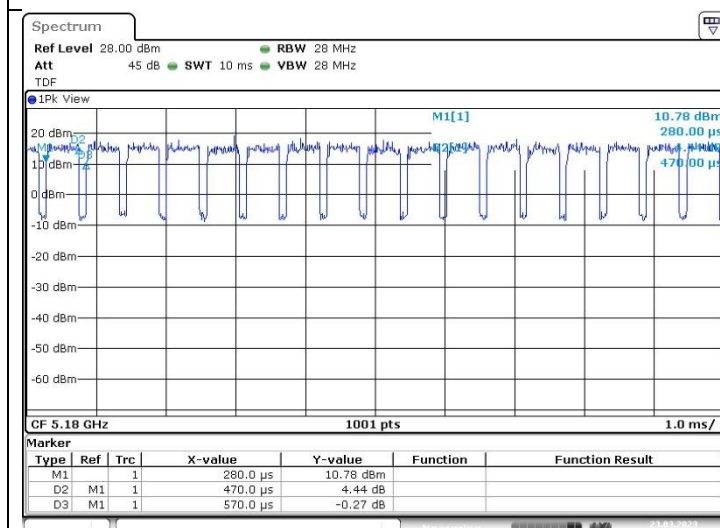
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SISO_Core 0

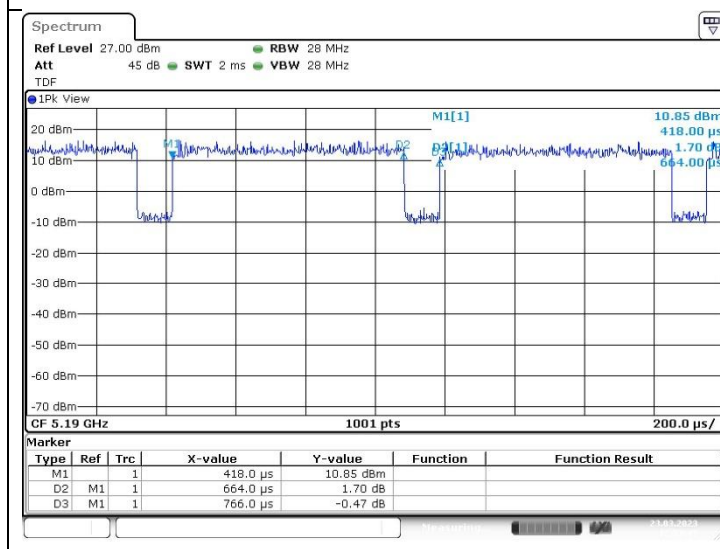
802.11a



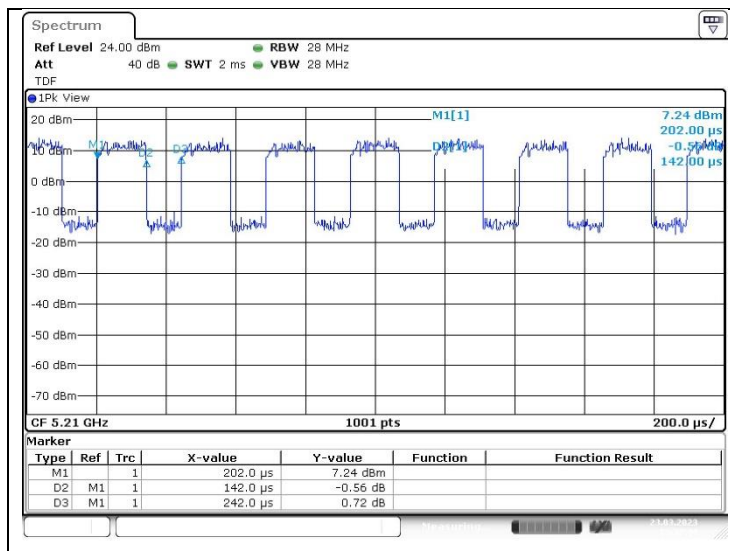
802.11n_HT20



802.11n_HT40

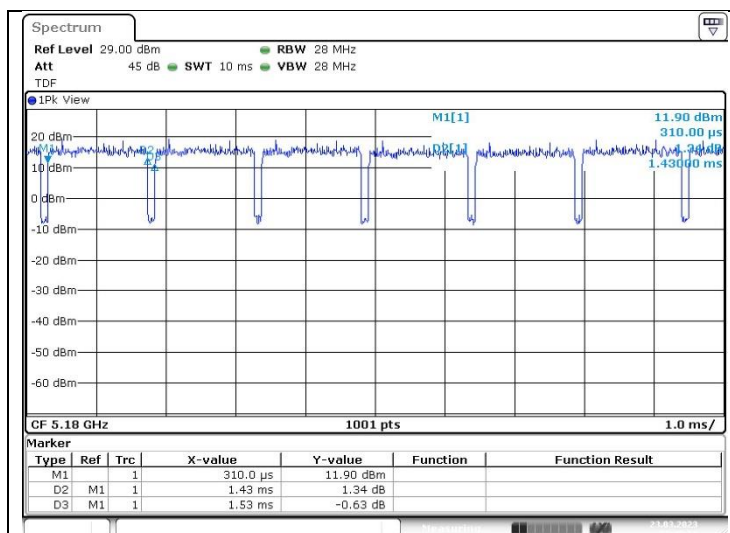


802.11ac_VHT80

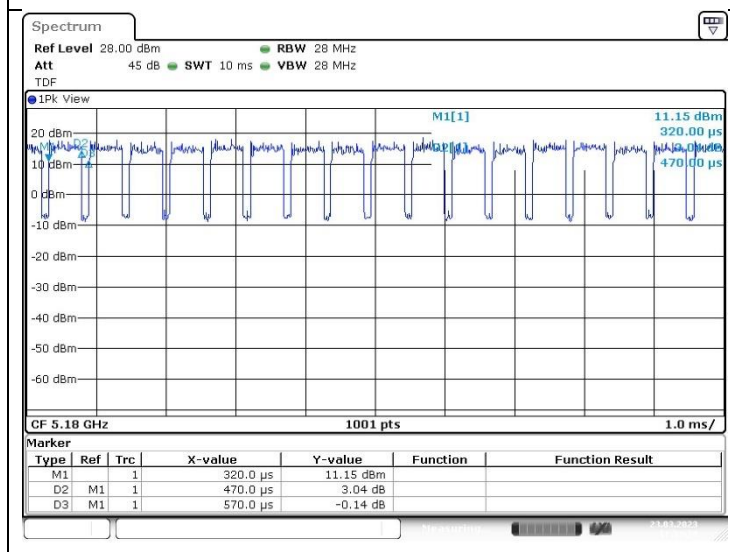


SISO_Core 1

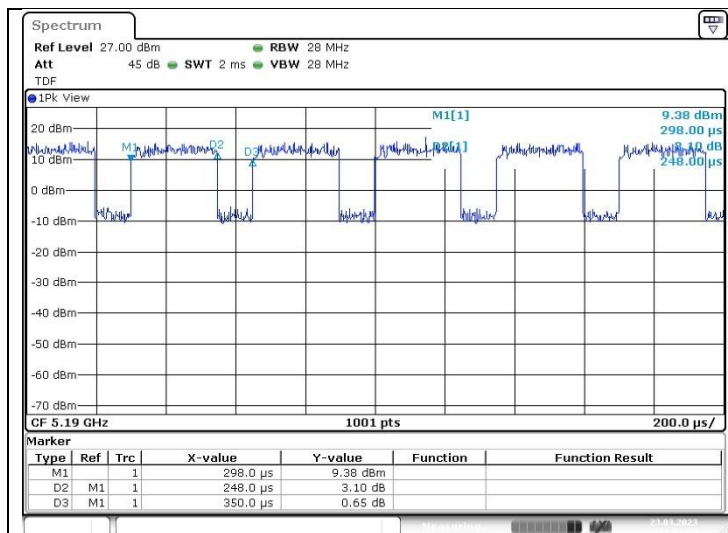
802.11a



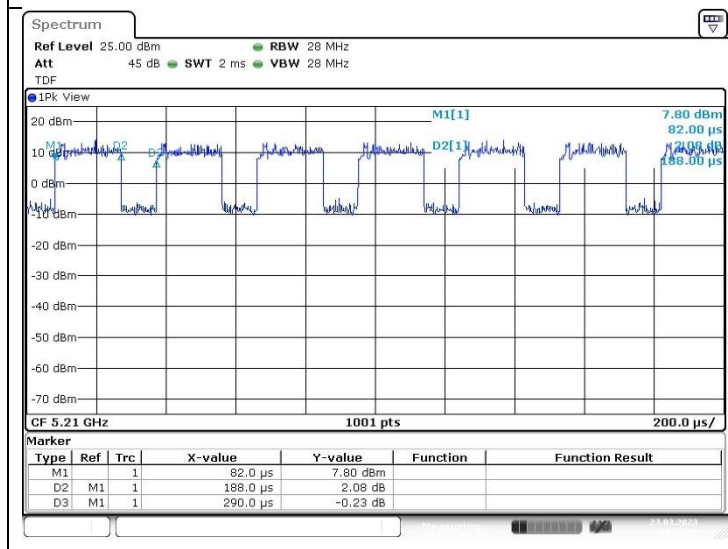
802.11ac_VHT20



802.11n_HT40

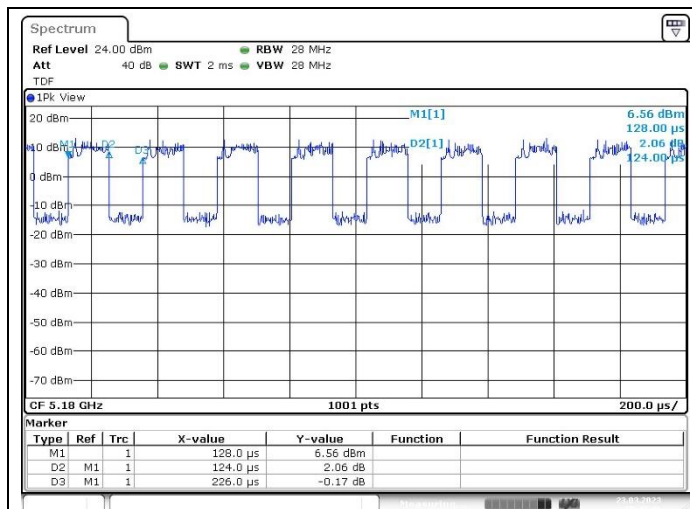


802.11ac_VHT80

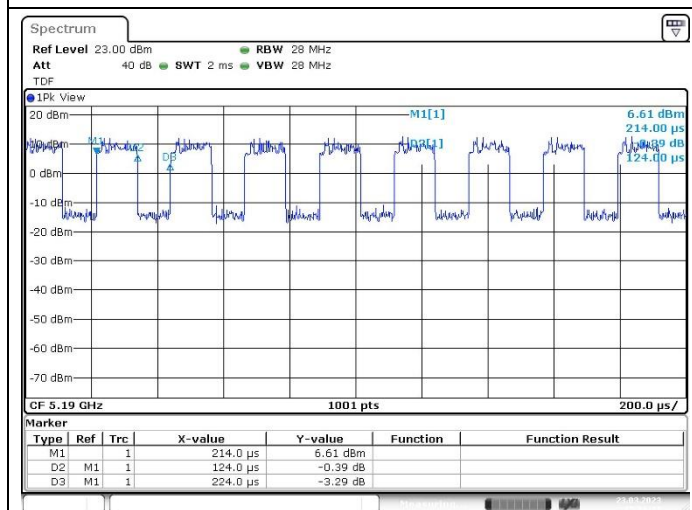


MIMO

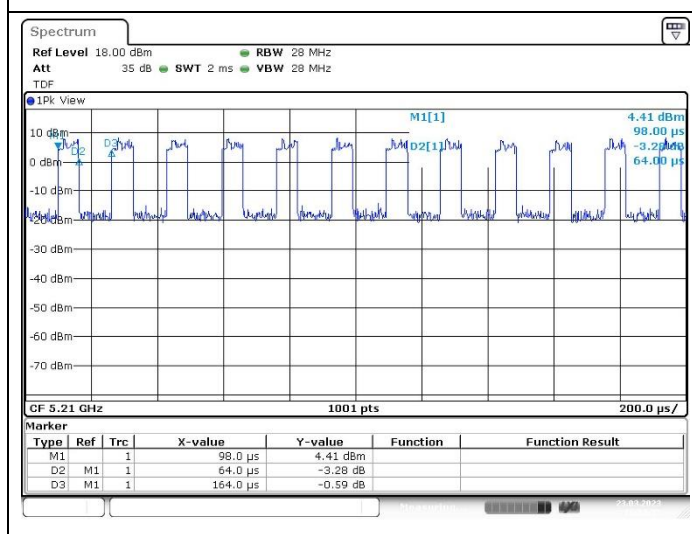
802.11n_HT20



802.11ac_VHT40



802.11ac_VHT80

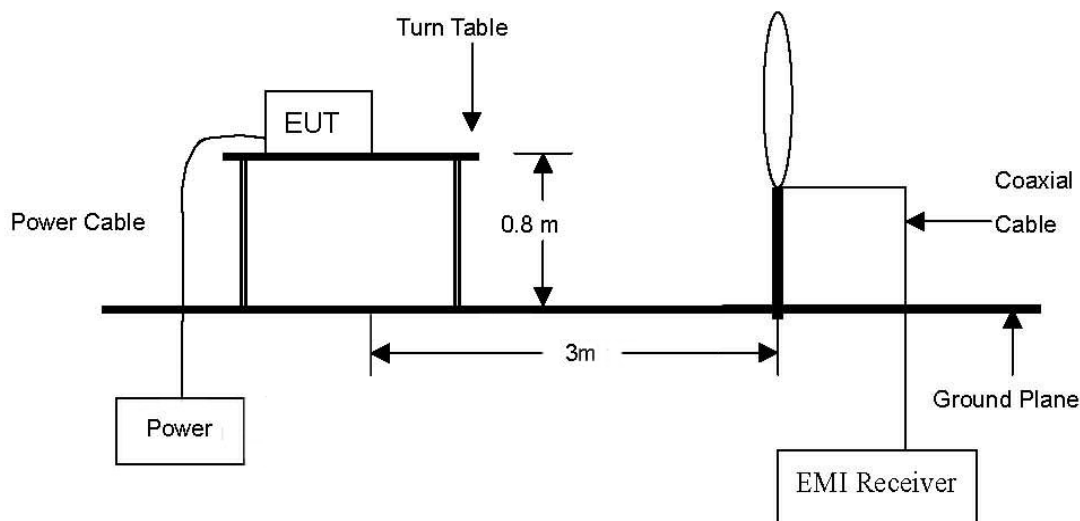


2. Transmitter Radiated Spurious Emissions

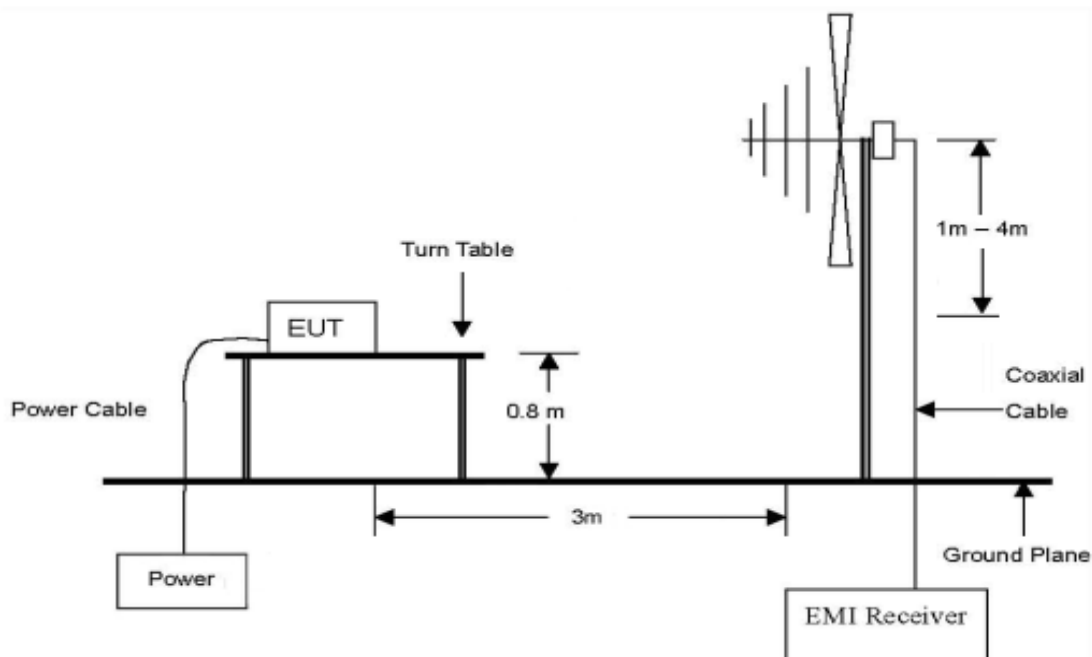
2.1. Test Setup

2.1.1. Transmitter radiated spurious emissions

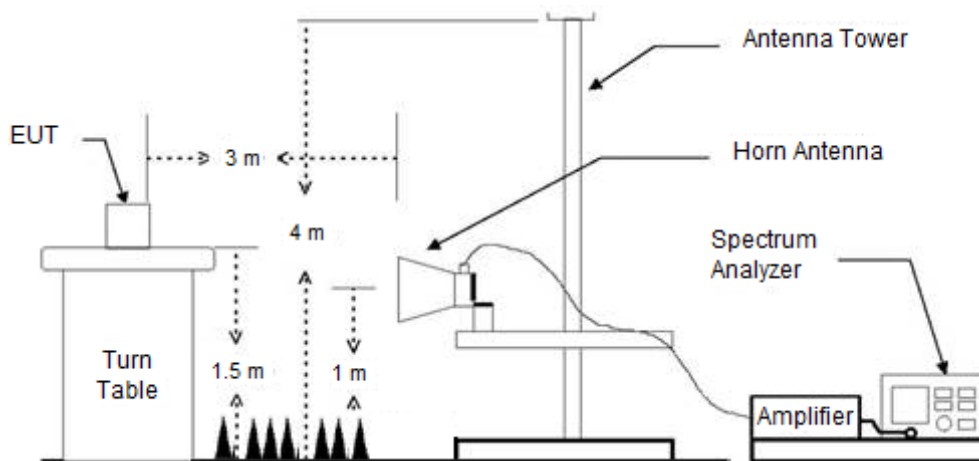
The diagram below shows the test setup that is utilized to make the measurements for emission from 9 kHz to 30 MHz emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission. The spurious emissions were investigated from 1 GHz to the 10th harmonic of the highest fundamental frequency or 40 GHz, whichever is lower.



2.2. Limit

2.2.1. FCC

According to § 15.407(b)

- (1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dB m/MHz.
- (2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dB m/MHz.
- (3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dB m/MHz.
- (4) For transmitters operating in the 5.725-5.85 GHz band:
 - (i) All emissions shall be limited to a level of -27 dB m/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dB m/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dB m/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dB m/MHz at the band edge.

According to § 15.209(a), except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	Measurement Distance (Meters)
0.009-0.490	2 400/F(kHz)	300
0.490-1.705	24 000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§15.231 and 15.241.

2.2.2. IC

According to RSS-247 Issue 2,

6.2.1.2 Frequency band 5 150-5 250 MHz

For transmitters with operating frequencies in the band 5 150-5 250 MHz, all emissions outside the band 5 150-5 350 MHz shall not exceed -27 dB m/MHz e.i.r.p. Any unwanted emissions that fall into the band 5 250-5 350 MHz shall be attenuated below the channel power by at least 26 dB, when measured using a resolution bandwidth between 1 and 5 % of the occupied bandwidth (i.e. 99% bandwidth), above 5 250 MHz. The 26 dB bandwidth may fall into the 5 250-5 350 MHz band; however, if the occupied bandwidth also falls within the 5 250- 5350 MHz band, the transmission is considered as intentional and the devices shall comply with all requirements in the band 5 250-5 350 MHz including implementing dynamic frequency selection (DFS) and TPC, on the portion of the emission that resides in the 5 250-5 350 MHz band.

6.2.2.2 Frequency band 5 250-5 350 MHz

Devices shall comply with the following:

a) All emissions outside the band 5 250-5 350 MHz shall not exceed -27 dBm/MHz e.i.r.p.; or

b) All emissions outside the band 5 150-5 350 MHz shall not exceed -27 dBm/MHz e.i.r.p. and its power shall comply with the spectral power density for operation within the band 5 150-5 250 MHz. The device, except devices installed in vehicles, shall be labelled or include in the user manual the following text “for indoor use only.”

6.2.3.2 Frequency band 5 470-5 600 MHz and 5 650-5 725 MHz

Emissions outside the band 5 470-5 725 MHz shall not exceed -27 dB m/MHz e.i.r.p. However, devices with bandwidth overlapping the band edge of 5 725 MHz can meet the emission limit of -27 dB m/MHz e.i.r.p. at 5 850 MHz instead of 5 725 MHz.

6.2.4.2 Frequency band 5 725-5 850 MHz

Devices operating in the band 5 725-5 850 MHz with antenna gain greater than 10 dBi can have unwanted emissions that comply with either the limits in this section or in section 5.5 until six (6) months after the publication date of this standard for certification. Certified devices that do not comply with emission limits in this section shall not be manufactured, imported, distributed, leased, offered for sale or sold after April 1, 2018.

Devices operating in the band 5 725-5 850 MHz with antenna gain of 10 dBi or less can have unwanted emissions that comply with either the limits in this section or in section 5.5 until April 1, 2018 for certification. Certified devices that do not comply with emission limits in this section shall not be manufactured, imported, distributed, leased, offered for sale or sold after April 1, 2020.

Devices operating in the band 5 725-5 850 MHz shall have e.i.r.p. of unwanted emissions comply with the following:

a) 27 dBm/MHz at frequencies from the band edges decreasing linearly to 15.6 dBm/MHz at 5 MHz above or below the band edges;

b) 15.6 dBm/MHz at 5 MHz above or below the band edges decreasing linearly to 10 dBm/MHz at 25 MHz above or below the band edges;

c) 10 dBm/MHz at 25 MHz above or below the band edges decreasing linearly to -27 dBm/MHz at 75 MHz above or below the band edges; and

d) -27 dBm/MHz at frequencies more than 75 MHz above or below the band edges.

2.3. Test Procedures

Radiated spurious emissions from the EUT were measured according to the dictates in section G of KDB 789033 D02 General UNII Test Procedures New Rules v02r01 and ANSI C63.10-2013.

2.3.1. Test Procedures for emission below 30 MHz

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
2. Then antenna is a loop antenna is fixed at one meter above the ground to determine the maximum value of the field strength. Both parallel and perpendicular of the antenna are set to make the measurement.
3. For each suspected emission, the EUT was arranged to its worst case and then the table was turned from 0 degrees to 360 degrees to find the maximum reading.
4. The test-receiver system was set to average or quasi peak detect function and Specified Bandwidth with Maximum Hold Mode.

2.3.2. Test Procedures for emission from above 30 MHz

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site below 1 GHz and 1.5 meter above the ground at a 3 meter anechoic chamber test site above 1 GHz. The table was rotated 360 degrees to determine the position of the highest radiation.
2. During performing radiated emission below 1 GHz, the EUT was set 3 meters away from the interference receiving antenna, which was mounted on the top of a variable-height antenna tower. During performing radiated emission above 1 GHz, the EUT was set 3 meter away from the interference-receiving antenna.
3. The antenna is a bi-log antenna, a horn antenna and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. For measurements below 1 GHz resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.
6. For measurements Above 1 GHz resolution bandwidth is set to 1 MHz, the video bandwidth is set to 3 MHz for peak measurements and as applicable for average measurements.

- II.G.4. Unwanted emissions measurements below 1 GHz.

Compliance shall be demonstrated using CISPR quasi-peak detection; however, peak detection is permitted as an alternative to quasi-peak detection.

- II.G.5. Unwanted maximum emissions measurements above 1 GHz.

Peak emission levels are measured by setting the analyzer as follows:

Set to RBW = 1 MHz, VBW ≥ 3 MHz, Detector = Peak, Sweep time = auto, Trace mode = Max hold.

- II.G.6. Average unwanted emissions measurements above 1 GHz.

Set to RBW = 1 MHz, VBW ≥ 3 MHz, Detector = power averaging (rms), Averaging type = power averaging (rms), Sweep time = auto, Perform a trace average of at least 100 traces. If the transmission is continuous, If the transmission is not continuous, the number of traces shall be increased by a factor of 1/x, where x is the duty cycle. For example, with 50 % duty cycle, at least 200 traces shall be averaged.

If tests are performed with the EUT transmitting at a duty cycle less than 98 %, a correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 % duty cycle. The correction factor is computed as follows:

- If power averaging (rms) mode was used in II.G.6.c)(iv), the correction factor is $10 \log (1 / x)$, where x is the duty cycle. For example, if the transmit duty cycle was 50 %, then 3 dB must be added to the measured emission levels.

- The test orthogonal plan of EUT was investigated with three axis described in the test setup photo.

The X-axis was worst-case, all radiated testing of EUT was performed with **X-axis**.

2.4. Test Result

Ambient temperature : (23 ± 1) °C
Relative humidity : 47 % R.H.

2.4.1. Radiated Spurious Emission below 1 000 MHz

The frequency spectrum from 9 kHz to 1 000 MHz was investigated. All reading values are peak values.

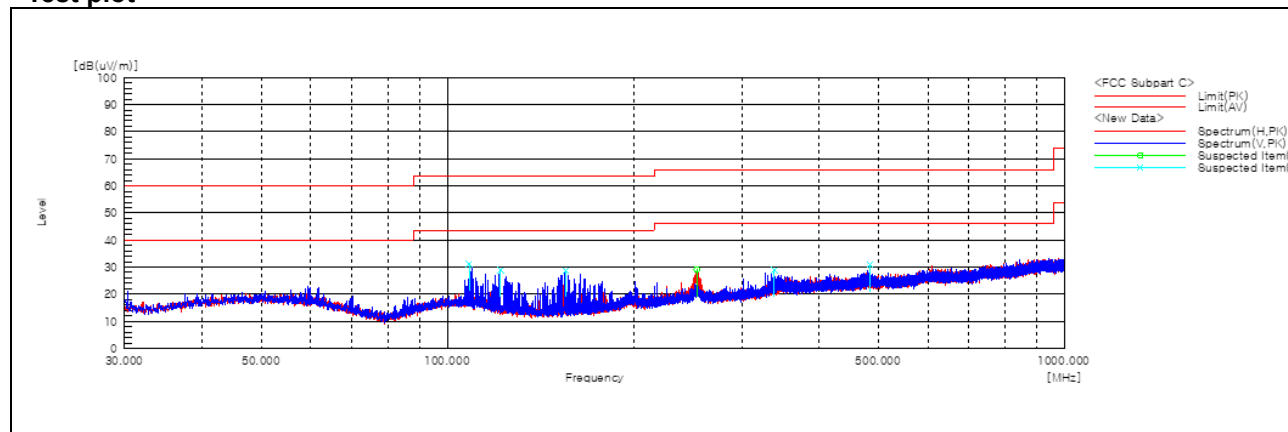
- Core 0

Radiated Emissions			Ant.	Correction Factors		Total	Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	AMP + CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
108.53	40.60	Peak	V	17.39	-26.81	31.18	43.50	12.32
121.83	40.40	Peak	V	15.22	-26.63	28.99	43.50	14.51
155.45	41.40	Peak	V	14.05	-26.53	28.92	43.50	14.58
253.42	36.60	Peak	H	18.60	-25.68	29.52	46.00	16.48
338.42	34.20	Peak	V	20.32	-25.17	29.35	46.00	16.65
483.56	34.30	Peak	V	22.68	-25.68	31.30	46.00	14.70
Above 500.00	Not detected	-	-	-	-	-	-	-

Remark;

1. Spurious emissions for all channels and modes were investigated and almost the same below 1 GHz.
2. Test from 30 MHz to 1 000 MHz was performed using the software of EP5RE(V5.3.70) from TOYO.
3. Reported spurious emissions are in **11a (Band 2C) / High channel** as worst case among other modes.
4. Radiated spurious emission measurement as below.
(Actual = Reading + AF + AMP + CL)
5. According to §15.31(o), emission levels are not report much lower than the limits by over 20 dB.

- Test plot



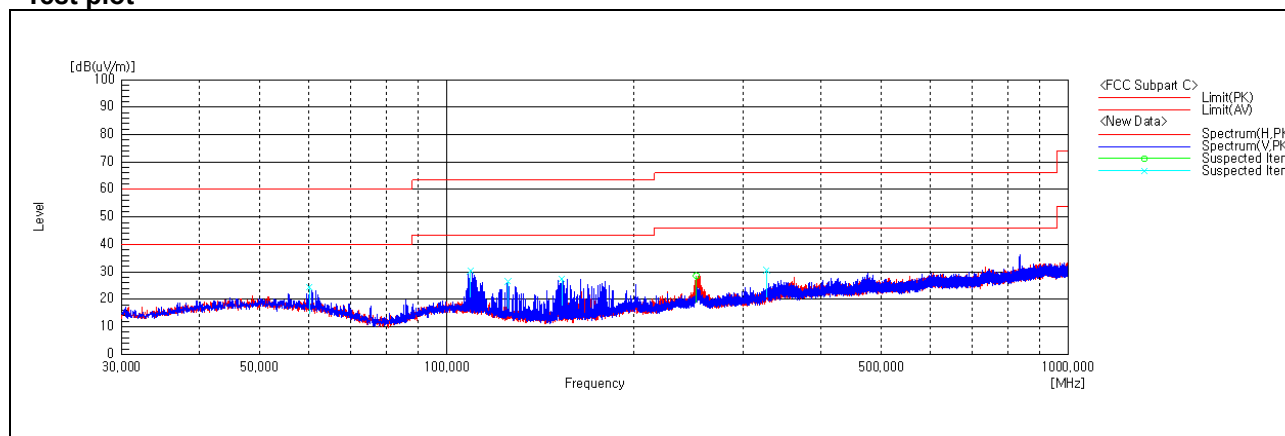
- Core 1

Radiated Emissions			Ant.	Correction Factors		Total	Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	AMP + CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
60.07	33.60	Peak	V	18.29	-27.17	24.72	40.00	15.28
109.14	40.10	Peak	V	17.29	-26.80	30.59	43.50	12.91
125.34	38.60	Peak	V	14.70	-26.52	26.78	43.50	16.72
153.07	40.40	Peak	V	13.90	-26.55	27.75	43.50	15.75
252.21	36.00	Peak	H	18.60	-25.71	28.89	46.00	17.11
327.14	36.30	Peak	V	19.76	-25.31	30.75	46.00	15.25
Above 400.00	Not detected	-	-	-	-	-	-	-

Remark;

1. Spurious emissions for all channels and modes were investigated and almost the same below 1 GHz.
2. Test from 30 MHz to 1 000 MHz was performed using the software of EP5RE(V5.3.70) from TOYO.
3. Reported spurious emissions are in **11a (Band 2C) / High channel** as worst case among other modes.
4. Radiated spurious emission measurement as below.
(Actual = Reading + AF + AMP + CL)
5. According to §15.31(o), emission levels are not report much lower than the limits by over 20 dB.

- Test plot



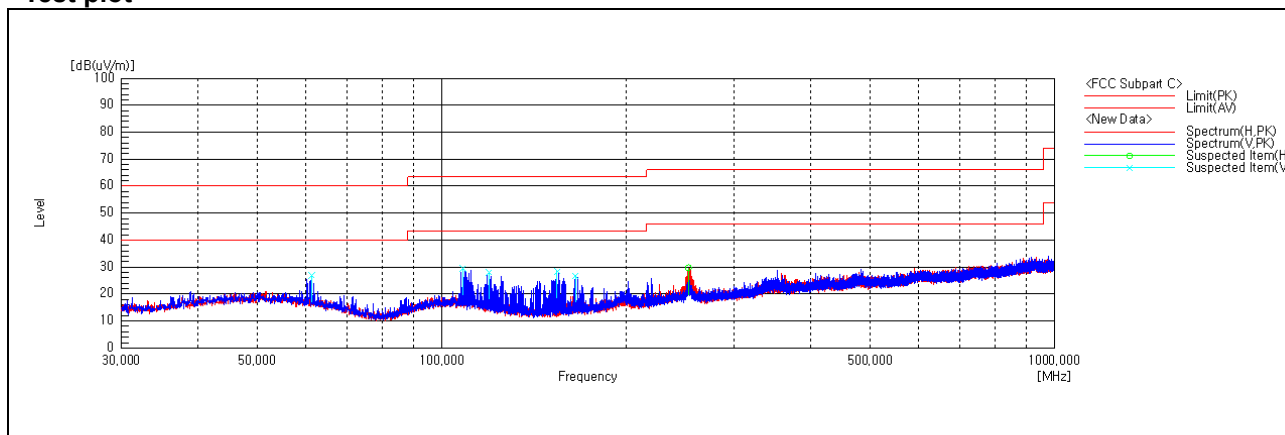
- MIMO

Radiated Emissions			Ant.	Correction Factors		Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP + CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
61.32	36.20	Peak	V	18.04	-27.15	27.09	40.00	12.91
108.21	38.90	Peak	V	17.46	-26.82	29.54	43.50	13.96
119.32	39.30	Peak	V	15.64	-26.68	28.26	43.50	15.24
154.24	41.20	Peak	V	13.92	-26.53	28.59	43.50	14.91
165.32	38.90	Peak	V	14.60	-26.45	27.05	43.50	16.45
252.49	37.20	Peak	H	18.60	-25.71	30.09	46.00	15.91
Above 300.00	Not detected	-	-	-	-	-	-	-

Remark;

- Spurious emissions for all channels and modes were investigated and almost the same below 1 GHz.
- Test from 30 MHz to 1 000 MHz was performed using the software of EP5RE(V5.3.70) from TOYO.
- Reported spurious emissions are in **11ac VHT40 (Band 2C) / High channel** as worst case among other modes.
- Radiated spurious emission measurement as below.
(Actual = Reading + AF + AMP + CL)
- According to §15.31(o), emission levels are not report much lower than the limits by over 20 dB.

- Test plot



2.4.2. Radiated Spurious Emission above 1 000 MHz

- Core 0

OFDM: 802.11a (Band 1)_Core 0

A. Low Channel (5 180 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	DF (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*4 500.00	41.75	Peak	H	32.00	-36.58	-	37.17	74.00	36.83
*4 500.00	31.69	Average	H	32.00	-36.58	0.43	27.54	54.00	26.46
*5 143.32	52.41	Peak	H	33.60	-35.38	-	50.63	74.00	23.37
*5 148.06	42.37	Average	H	33.60	-35.41	0.43	40.99	54.00	13.01
*5 150.00	51.76	Peak	H	33.60	-35.42	-	49.94	74.00	24.06
*5 150.00	42.00	Average	H	33.60	-35.42	0.43	40.61	54.00	13.39

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
10 360.17	42.85	Peak	H	37.72	-31.33	-	49.24	68.23	18.99
Above 10 400.00	Not detected	-	-	-	-	-	-	-	-

B. Middle Channel (5 220 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
10 440.05	44.84	Peak	H	37.80	-31.23	-	51.41	68.23	16.82
Above 10 500.00	Not detected	-	-	-	-	-	-	-	-

C. High Channel (5 240 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
10 479.88	44.28	Peak	H	37.80	-31.22	-	50.86	68.23	17.37
Above 10 500.00	Not detected	-	-	-	-	-	-	-	-

OFDM: 802.11a (Band 2A)_Core 0

A. Low Channel (5 260 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
10 520.20	46.45	Peak	H	37.76	-31.37	-	52.84	68.23	15.39
Above 1 000.00	Not detected	-	-	-	-	-	-	-	-

B. Middle Channel (5 300 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*10 600.02	45.45	Peak	H	37.80	-31.29	-	51.96	74.00	22.04
Above 10 700.00	Not detected	-	-	-	-	-	-	-	-

C. High Channel (5 320 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	DF (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*5 350.00	50.99	Peak	H	34.10	-35.14	-	49.95	74.00	24.05
*5 350.00	41.90	Average	H	34.10	-35.14	0.43	41.29	54.00	12.71
*5 362.50	52.45	Peak	H	34.13	-35.23	-	51.35	74.00	22.65
*5 350.51	42.29	Average	H	34.10	-35.14	0.43	41.68	54.00	12.32
*5 460.00	41.74	Peak	H	34.10	-34.99	-	40.85	74.00	33.15
*5 460.00	32.76	Average	H	34.10	-34.99	0.43	32.30	54.00	21.70

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*10 639.99	46.20	Peak	H	37.88	-30.86	-	53.22	74.00	20.78
Above 10 700.00	Not detected	-	-	-	-	-	-	-	-

OFDM: 802.11a (Band 2C)_Core 0

A. Low Channel (5 500 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	DF (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*5 350.00	42.08	Peak	H	34.10	-35.14	-	41.04	74.00	32.96
*5 350.00	33.84	Average	H	34.10	-35.14	0.43	33.23	54.00	20.77
*5 456.23	53.00	Peak	H	34.10	-34.99	-	52.11	74.00	21.89
*5 458.83	43.38	Average	H	34.10	-34.99	0.43	42.92	54.00	11.08
*5 460.00	52.03	Peak	H	34.10	-34.99	-	51.14	74.00	22.86
*5 460.00	43.05	Average	H	34.10	-34.99	0.43	42.59	54.00	11.41

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*11 000.00	47.55	Peak	H	38.20	-31.07	-	54.68	74.00	19.32
*11 000.03	43.99	Average	H	38.20	-31.07	0.43	51.55	54.00	2.45
Above 11 100.00	Not detected	-	-	-	-	-	-	-	-

B. Middle Channel (5 580 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*11 160.10	46.44	Peak	H	38.24	-30.77	-	53.91	74.00	20.09
Above 11 200.00	Not detected	-	-	-	-	-	-	-	-

C. High Channel (5 700 MHz)

Radiated Emissions			Ant.	Correction Factors		Total	Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5 725.00	49.98	Peak	H	34.05	-35.15	48.88	68.23	19.35
5 735.25	53.36	Peak	H	34.05	-35.14	52.27	68.23	15.96

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*11 399.89	41.24	Peak	H	38.50	-30.51	-	49.23	74.00	24.77
Above 11 400.00	Not detected	-	-	-	-	-	-	-	-

OFDM: 802.11a (Band 3)_Core 0

A. Low Channel (5 745 MHz)

Radiated Emissions			Ant.	Correction Factors		Total	Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5 648.02	43.39	Peak	H	34.10	-33.79	43.70	68.23	24.53
5 695.13	51.46	Peak	H	34.10	-34.77	50.79	101.62	50.83
5 703.73	53.44	Peak	H	34.11	-34.83	52.72	106.27	53.55
5 724.62	61.41	Peak	H	34.20	-34.07	61.54	121.36	59.82

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*11 489.89	42.02	Peak	H	38.60	-30.83	-	49.79	74.00	24.21
Above 11 500.00	Not detected	-	-	-	-	-	-	-	-

B. Middle Channel (5 785 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*11 569.85	41.14	Peak	H	38.60	-30.37	-	49.37	74.00	24.63
Above 11 600.00	Not detected	-	-	-	-	-	-	-	-

C. High Channel (5 825 MHz)

Radiated Emissions			Ant.	Correction Factors		Total	Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5 850.58	52.37	Peak	H	34.40	-34.23	52.54	120.91	68.37
5 860.00	52.31	Peak	H	34.44	-34.27	52.48	109.43	56.95
5 880.45	49.21	Peak	H	34.52	-34.19	49.54	101.19	51.65
5 933.07	43.20	Peak	H	34.67	-34.15	43.72	68.23	24.51

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*11 650.04	39.53	Peak	H	38.70	-29.96	-	48.27	74.00	25.73
Above 11 700.00	Not detected	-	-	-	-	-	-	-	-

OFDM: 802.11n_HT20 (Band 1)_Core 0

A. Low Channel (5 180 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	DF (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*4 500.00	41.88	Peak	H	32.00	-36.58	-	37.30	74.00	36.70
*4 500.00	31.60	Average	H	32.00	-36.58	0.84	27.86	54.00	26.14
*5 144.11	53.91	Peak	H	33.60	-35.39	-	52.12	74.00	21.88
*5 148.06	42.56	Average	H	33.60	-35.41	0.84	41.59	54.00	12.41
*5 150.00	51.84	Peak	H	33.60	-35.42	-	50.02	74.00	23.98
*5 150.00	42.69	Average	H	33.60	-35.42	0.84	41.71	54.00	12.29

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
10 360.05	42.41	Peak	H	37.72	-31.33	-	48.80	68.23	19.43
Above 10 400.00	Not detected	-	-	-	-	-	-	-	-

B. Middle Channel (5 220 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
10 439.89	44.61	Peak	H	37.80	-31.24	-	51.17	68.23	17.06
Above 10 500.00	Not detected	-	-	-	-	-	-	-	-

C. High Channel (5 240 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
10 479.88	44.27	Peak	H	37.80	-31.22	-	50.85	68.23	17.38
Above 10 500.00	Not detected	-	-	-	-	-	-	-	-

OFDM: 802.11n_HT20 (Band 2A)_Core 0

A. Low Channel (5 260 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
10 520.18	45.89	Peak	H	37.76	-31.37	-	52.28	68.23	15.95
Above 10 600.00	Not detected	-	-	-	-	-	-	-	-

B. Middle Channel (5 300 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*10 599.99	45.64	Peak	H	37.80	-31.29	-	52.15	74.00	21.85
Above 10 600.00	Not detected	-	-	-	-	-	-	-	-

C. High Channel (5 320 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	DF (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*5 350.00	50.55	Peak	H	34.10	-35.14	-	49.51	74.00	24.49
*5 350.00	41.30	Average	H	34.10	-35.14	0.84	41.10	54.00	12.90
*5 350.75	51.92	Peak	H	34.10	-35.15	-	50.87	74.00	23.13
*5 356.50	41.64	Average	H	34.11	-35.19	0.84	41.40	54.00	12.60
*5 460.00	40.69	Peak	H	34.10	-34.99	-	39.80	74.00	34.20
*5 460.00	32.47	Average	H	34.10	-34.99	0.84	32.42	54.00	21.58

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*10 639.83	46.42	Peak	H	37.88	-30.87	-	53.43	74.00	20.57
Above 10 700.00	Not detected	-	-	-	-	-	-	-	-

OFDM: 802.11n_HT20 (Band 2C)_Core 0

A. Low Channel (5 500 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	DF (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*5 350.00	42.64	Peak	H	34.10	-35.14	-	41.60	74.00	32.40
*5 350.00	33.50	Average	H	34.10	-35.14	0.84	33.30	54.00	20.70
*5 455.71	52.58	Peak	H	34.10	-34.99	-	51.69	74.00	22.31
*5 458.83	41.67	Average	H	34.10	-34.99	0.84	41.62	54.00	12.38
*5 460.00	50.25	Peak	H	34.10	-34.99	-	49.36	74.00	24.64
*5 460.00	41.67	Average	H	34.10	-34.99	0.84	41.62	54.00	12.38

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*11 000.11	47.18	Peak	H	38.20	-31.07	-	54.31	74.00	19.69
*11 000.03	44.03	Average	H	38.20	-31.07	0.84	52.00	54.00	2.00
Above 11 100.00	Not detected	-	-	-	-	-	-	-	-

B. Middle Channel (5 580 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*11 160.10	46.44	Peak	H	38.24	-30.77	-	53.91	74.00	20.09
Above 11 200.00	Not detected	-	-	-	-	-	-	-	-

C. High Channel (5 700 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	DF (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5 725.00	55.77	Peak	H	34.05	-35.15		54.67	68.23	13.56
5 725.50	54.35	Peak	H	34.05	-35.15		53.25	68.23	14.98

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*11 399.89	41.24	Peak	H	38.50	-30.51	-	49.23	74.00	24.77
Above 11 400.00	Not detected	-	-	-	-	-	-	-	-

OFDM: 802.11n_HT20 (Band 3)_Core 0

A. Low Channel (5 745 MHz)

Radiated Emissions			Ant.	Correction Factors		Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
5 602.97	43.31	Peak	H	34.19	-34.53	42.97	68.23	25.26
5 699.02	51.05	Peak	H	34.10	-34.92	50.23	104.50	54.27
5 718.68	52.62	Peak	H	34.17	-34.29	52.50	110.46	57.96
5 724.00	61.03	Peak	H	34.20	-34.10	61.13	119.95	58.82

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*11 490.02	42.00	Peak	H	38.60	-30.83	-	49.77	74.00	24.23
Above 11 500.00	Not detected	-	-	-	-	-	-	-	-

B. Middle Channel (5 785 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*11 570.11	41.26	Peak	H	38.60	-30.36	-	49.50	74.00	24.50
Above 11 600.00	Not detected	-	-	-	-	-	-	-	-

C. High Channel (5 825 MHz)

Radiated Emissions			Ant.	Correction Factors		Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
5 850.35	51.85	Peak	H	34.40	-34.23	52.02	121.43	69.41
5 855.86	50.27	Peak	H	34.42	-34.25	50.44	110.59	60.15
5 883.44	49.20	Peak	H	34.53	-34.12	49.61	98.98	49.37
5 939.27	43.21	Peak	H	34.68	-34.33	43.56	68.23	24.67

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*11 649.73	40.12	Peak	H	38.70	-29.97	-	48.85	74.00	25.15
Above 11 700.00	Not detected	-	-	-	-	-	-	-	-

OFDM: 802.11n_HT40 (Band 1)_Core 0

A. Low Channel (5 190 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	DF (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*4 500.00	40.55	Peak	H	32.00	-36.58	-	35.97	74.00	38.03
*4 500.00	32.22	Average	H	32.00	-36.58	0.62	28.26	54.00	25.74
*5 146.48	64.42	Peak	H	33.60	-35.40	-	62.62	74.00	11.38
*5 148.06	50.73	Average	H	33.60	-35.41	0.62	49.54	54.00	4.46
*5 150.00	64.29	Peak	H	33.60	-35.42	-	62.47	74.00	11.53
*5 150.00	51.39	Average	H	33.60	-35.42	0.62	50.19	54.00	3.81

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
10 379.98	43.01	Peak	H	37.76	-31.59	-	49.18	68.23	19.05
Above 10 400.00	Not detected	-	-	-	-	-	-	-	-

B. High Channel (5 230 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
10 459.84	44.06	Peak	H	37.80	-31.19	-	50.67	68.23	17.56
Above 10 500.00	Not detected	-	-	-	-	-	-	-	-

OFDM: 802.11n_HT40 (Band 2A)_Core 0

A. Low Channel (5 270 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
10 540.02	46.31	Peak	H	37.72	-31.50	-	52.53	68.23	15.70
Above 10 600.00	Not detected	-	-	-	-	-	-	-	-

B. High Channel (5 310 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	DF (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*5 350.00	59.93	Peak	H	34.10	-35.14	-	58.89	74.00	15.11
*5 350.00	48.16	Average	H	34.10	-35.14	0.62	47.74	54.00	6.26
*5 351.23	61.97	Peak	H	34.10	-35.15	-	60.92	74.00	13.08
*5 350.27	47.93	Average	H	34.10	-35.14	0.62	47.51	54.00	6.49
*5 460.00	41.21	Peak	H	34.10	-34.99	-	40.32	74.00	33.68
*5 460.00	33.50	Average	H	34.10	-34.99	0.62	33.23	54.00	20.77

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*10 620.33	45.83	Peak	H	37.84	-31.21	-	52.46	74.00	21.54
Above 10 700.00	Not detected	-	-	-	-	-	-	-	-

OFDM: 802.11n_HT40 (Band 2C)_Core 0

A. Low Channel (5 510 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	DF (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*5 350.00	44.37	Peak	H	34.10	-35.14	-	43.33	74.00	30.67
*5 350.00	34.82	Average	H	34.10	-35.14	0.62	34.40	54.00	19.60
*5 438.57	52.96	Peak	H	34.12	-35.15	-	51.93	74.00	22.07
*5 459.61	43.01	Average	H	34.10	-34.99	0.62	42.74	54.00	11.26
*5 460.00	51.78	Peak	H	34.10	-34.99	-	50.89	74.00	23.11
*5 460.00	43.14	Average	H	34.10	-34.99	0.62	42.87	54.00	11.13

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*11 019.91	46.88	Peak	H	38.20	-30.88	-	54.20	74.00	19.80
*11 020.02	43.99	Average	H	38.20	-30.88	0.62	51.93	54.00	2.07
Above 11 100.00	Not detected	-	-	-	-	-	-	-	-

B. Middle Channel (5 550 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*11 100.10	45.52	Peak	H	38.10	-30.94	-	52.68	74.00	21.32
Above 11 200.00	Not detected	-	-	-	-	-	-	-	-

C. High Channel (5 670 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	DF (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
5 725.00	49.46	Peak	H	34.05	-35.15		48.36	68.23	19.87
5 735.00	51.92	Peak	H	34.01	-35.10		50.83	68.23	17.40

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*11 339.94	43.33	Peak	H	38.20	-30.71	-	50.82	74.00	23.18
Above 11 400.00	Not detected	-	-	-	-	-	-	-	-

OFDM: 802.11n_HT40 (Band 3)_Core 0

A. Low Channel (5 755 MHz)

Radiated Emissions			Ant.	Correction Factors		Total	Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5 646.39	45.37	Peak	H	34.11	-33.79	45.69	68.23	22.54
5 697.38	51.37	Peak	H	34.10	-34.86	50.61	103.29	52.68
5 720.00	63.20	Peak	H	34.18	-34.24	63.14	110.83	47.69
5 723.80	65.92	Peak	H	34.20	-34.10	66.02	119.49	53.47

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*11 510.14	41.24	Peak	H	38.60	-30.66	-	49.18	74.00	24.82
Above 11 600.00	Not detected	-	-	-	-	-	-	-	-

B. High Channel (5 795 MHz)

Radiated Emissions			Ant.	Correction Factors		Total	Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5 850.00	50.53	Peak	H	34.40	-34.23	50.70	122.23	71.53
5 866.20	50.92	Peak	H	34.46	-34.28	51.10	107.69	56.59
5 876.08	48.31	Peak	H	34.50	-34.29	48.52	104.43	55.91
5 936.05	43.13	Peak	H	34.67	-34.24	43.56	68.23	24.67

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*11 590.23	40.55	Peak	H	38.60	-30.30	-	48.85	74.00	25.15
Above 11 600.00	Not detected	-	-	-	-	-	-	-	-

OFDM: 802.11ac_VHT80 (Band 1)_Core 0

A. Middle Channel (5 210 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	DF (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*4 500.00	40.58	Peak	H	32.00	-36.58	-	36.00	74.00	38.00
*4 500.00	32.13	Average	H	32.00	-36.58	2.32	29.87	54.00	24.13
*5 148.06	65.11	Peak	H	33.60	-35.41	-	63.30	74.00	10.70
*5 144.90	50.85	Average	H	33.60	-35.39	2.32	51.38	54.00	2.62
*5 150.00	63.45	Peak	H	33.60	-35.42	-	61.63	74.00	12.37
*5 150.00	50.83	Average	H	33.60	-35.42	2.32	51.33	54.00	2.67

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
10 420.10	44.56	Peak	H	37.80	-31.38	-	50.98	68.23	17.25
Above 10 500.00	Not detected	-	-	-	-	-	-	-	-

OFDM: 802.11ac_VHT80 (Band 2A)_Core 0

A. Middle Channel (5 290 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	DF (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*5 350.00	62.53	Peak	H	34.10	-35.14	-	61.49	74.00	12.51
*5 350.00	49.69	Average	H	34.10	-35.14	2.32	50.97	54.00	3.03
*5 351.23	63.77	Peak	H	34.10	-35.15	-	62.72	74.00	11.28
*5 351.95	50.20	Average	H	34.10	-35.15	2.32	51.47	54.00	2.53
*5 460.00	45.89	Peak	H	34.10	-34.99	-	45.00	74.00	29.00
*5 460.00	35.49	Average	H	34.10	-34.99	2.32	36.92	54.00	17.08

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
10 580.02	46.02	Peak	H	37.76	-31.11	-	52.67	68.23	15.56
Above 10 600.00	Not detected	-	-	-	-	-	-	-	-

OFDM: 802.11ac_VHT80 (Band 2C)_Core 0

A. Low Channel (5 530 MHz)

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	DF (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*5 350.00	47.08	Peak	H	34.10	-35.14	-	46.04	74.00	27.96
*5 350.00	37.27	Average	H	34.10	-35.14	2.32	38.55	54.00	15.45
*5 457.79	60.00	Peak	H	34.10	-34.99	-	59.11	74.00	14.89
*5 458.83	47.52	Average	H	34.10	-34.99	2.32	48.95	54.00	5.05
*5 460.00	57.51	Peak	H	34.10	-34.99	-	56.62	74.00	17.38
*5 460.00	46.97	Average	H	34.10	-34.99	2.32	48.40	54.00	5.60

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*11 059.98	46.79	Peak	H	38.18	-30.93	-	54.04	74.00	19.96
*11 059.98	43.12	Average	H	38.18	-30.93	2.32	52.69	54.00	1.31
Above 11 100.00	Not detected	-	-	-	-	-	-	-	-

OFDM: 802.11ac_VHT80 (Band 3)_Core 0

A. Middle Channel (5 775 MHz)

Radiated Emissions			Ant.	Correction Factors		Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
5 649.25	47.77	Peak	H	34.10	-33.78	48.09	68.23	20.14
5 699.63	57.51	Peak	H	34.10	-34.94	56.67	104.95	48.28
5 718.88	60.02	Peak	H	34.18	-34.28	59.92	110.51	50.59
5 722.77	59.15	Peak	H	34.19	-34.14	59.20	117.14	57.94
5 850.00	56.64	Peak	H	34.40	-34.23	56.81	122.23	65.42
5 856.78	54.97	Peak	H	34.43	-34.26	55.14	110.33	55.19
5 875.85	50.06	Peak	H	34.50	-34.29	50.27	104.60	54.33
5 943.41	46.76	Peak	H	34.69	-34.46	46.99	68.23	21.24

Radiated Emissions			Ant.	Correction Factors			Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	DF (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*11 549.94	41.28	Peak	H	38.60	-30.80	-	49.08	74.00	24.92
Above 11 600.00	Not detected	-	-	-	-	-	-	-	-