






TEST REPORT

<p>Eurofins KCTL Co.,Ltd. 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-31-285-0894 FAX: 82-505-299-8311 www.kctl.co.kr</p>	<p>Report No.: KR23-SRF0028-A Page (1) of (27)</p>	 
<p>1. Client</p> <ul style="list-style-type: none"> ◦ Name : Samsung Electronics Co., Ltd. ◦ Address : 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea ◦ Date of Receipt : 2022-10-17 <p>2. Use of Report : Certification</p> <p>3. Name of Product / Model : Mobile phone / SM-A346B/DSN</p> <p>4. Manufacturer / Country of Origin : Samsung Electronics Co., Ltd. / Vietnam</p> <p>5. FCC ID : A3LSMA346B</p> <p>6. Date of Test : 2022-11-09 to 2023-01-04</p> <p>7. Location of Test : <input checked="" type="checkbox"/> Permanent Testing Lab <input type="checkbox"/> On Site Testing (Address:65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea)</p> <p>8. Test method used : FCC Part 15 Subpart E, 15.407</p> <p>9. Test Result : Refer to the test result in the test report</p>		
<p>Affirmation</p>	<p>Tested by</p> <p>Name : Sunghyun Yoon (Signature)</p>	<p>Technical Manager</p> <p>Name : Seungyong Kim (Signature)</p>
<p style="text-align: right;">2023-01-20</p> <p style="text-align: center;">Eurofins KCTL Co.,Ltd.</p> <p>As a test result of the sample which was submitted from the client, this report does not guarantee the whole product quality. This test report should not be used and copied without a written agreement by Eurofins KCTL Co.,Ltd.</p>		

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REPORT REVISION HISTORY

Date	Revision	Page No
2023-01-17	Originally issued	-
2023-01-20	Updated to TCB comment	11 ~ 12

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Note. The report No. KR23-SRF0028 is superseded by the report No. KR23-SRF0028-A.

General remarks for test reports

Statement concerning the uncertainty of the measurement systems used for the tests

(may be required by the product standard or client)

Internal procedure used for type testing through which traceability of the measuring uncertainty has been established:

Procedure number, issue date and title:

Calculations leading to the reported values are on file with the testing laboratory that conducted the testing.

Statement not required by the standard or client used for type testing

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1. General information

Client : Samsung Electronics Co., Ltd.
 Address : 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
 Manufacturer : Samsung Electronics Co., Ltd.
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 Laboratory : Eurofins KCTL Co.,Ltd.
 Address : 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea
 Accreditations : FCC Site Designation No: KR0040, FCC Site Registration No: 687132
 VCCI Registration No. : R-20080, G-20078, C-20059, T-20056
 CAB Identifier: KR0040
 ISED Number: 8035A
 KOLAS No.: KT231

2. Device information

Equipment under test : Mobile phone
 Model : SM-A346B/DSN
 Modulation technique : OFDM (802.11a/b/g/n/ac)
 Number of channels :
 UNII-1 : 4 ch (20 MHz), 2 ch (40 MHz), 1 ch (80 MHz)
 UNII-2A : 4 ch (20 MHz), 2 ch (40 MHz), 1 ch (80 MHz)
 UNII-2C : 12 ch (20 MHz), 6 ch (40 MHz), 3 ch (80 MHz)
 UNII-3 : 5 ch (20 MHz), 2 ch (40 MHz), 1 ch (80 MHz)
 Power source : DC 3.88 V
 Antenna specification :
 Antenna 1 : Metal+LDS Antenna
 Antenna 2 : Metal+LDS Antenna
 Antenna gain :

	Antenna 1	Antenna 2
UNII-1	: -8.89 dBi	UNII-1 : -9.78 dBi
UNII-2A	: -8.89 dBi	UNII-2A : -9.78 dBi
UNII-2C	: -8.70 dBi	UNII-2C : -9.51 dBi
UNII-3	: -9.03 dBi	UNII-3 : -9.43 dBi

 Frequency range :
 UNII-1 : 5 180 MHz ~ 5 240 MHz (802.11a/n/ac_HT20/VHT20)
 UNII-1 : 5 190 MHz ~ 5 230 MHz (802.11n/ac_HT40/VHT40)
 UNII-1 : 5 210 MHz (802.11ac_VHT80)
 UNII-2A : 5 260 MHz ~ 5 320 MHz (802.11a/n/ac_HT20/VHT20)
 UNII-2A : 5 270 MHz ~ 5 310 MHz (802.11n/ac_HT40/VHT40)
 UNII-2A : 5 290 MHz (802.11ac_VHT80)
 UNII-2C : 5 500 MHz ~ 5 720 MHz (802.11a/n/ac_HT20/VHT20)
 UNII-2C : 5 510 MHz ~ 5 710 MHz (802.11n/ac_HT40/VHT40)
 UNII-2C : 5 530 MHz ~ 5 690 MHz (802.11ac_VHT80)
 UNII-3 : 5 745 MHz ~ 5 825 MHz (802.11a/n/ac_HT20/VHT20)
 UNII-3 : 5 755 MHz ~ 5 795 MHz (802.11n/ac_HT40/VHT40)
 UNII-3 : 5 775 MHz (802.11ac_VHT80)
 Software version : A346B.001
 Hardware version : REV1.0
 Test device serial No. :
 Conducted : R3CTA0N813K
 Radiated : R3CTA0N84EX
 Operation temperature : -20 °C ~ 60 °C

2.1. Frequency/channel operations

This device contains the following capabilities:

WLAN (11a/b/g/n/ac), Bluetooth (BDR/EDR/BLE), LTE B2/4/5/12/17/26/41/66, GSM 850/1900, WCDMA 850/1700/1900, NFC

UNII-1		UNII-2A		UNII-2C		UNII-3	
Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)
36	5 180	52	5 260	100	5 500	149	5 745
40	5 200	56	5 280	120	5 600	157	5 785
48	5 240	64	5 320	140	5 700	165	5 825
				144	5 720		

Table 2.1-1. 802.11a/n/ac HT20/VHT20 mode

UNII-1		UNII-2A		UNII-2C		UNII-3	
Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)
38	5 190	54	5 270	102	5 510	151	5 755
46	5 230	62	5 310	118	5 590	159	5 795
				134	5 670		
				142	5 710		

Table 2.1-2. 802.11n/ac HT40/VHT40 mode

UNII-1		UNII-2A		UNII-2C		UNII-3	
Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)
42	5 210	58	5 290	106	5 530	155	5 775
				122	5 610		
				138	5 690		

Table 2.1-3. 802.11ac VHT80 mode

2.2. Duty Cycle Factor

SISO

Test mode	Period (ms)	T _{on} time (ms)	Duty cycle		Duty cycle factor (dB)
			(Linear)	(%)	
802.11a	1.486	1.388	0.934 1	93.41	0.30
802.11n_HT20	1.394	1.296	0.929 7	92.97	0.32
802.11n_HT40	0.746	0.647	0.867 3	86.73	0.62
802.11ac_VHT20	1.406	1.307	0.929 6	92.96	0.32
802.11ac_VHT40	0.750	0.652	0.869 3	86.93	0.61
802.11ac_VHT80	0.421	0.324	0.769 6	76.96	1.14

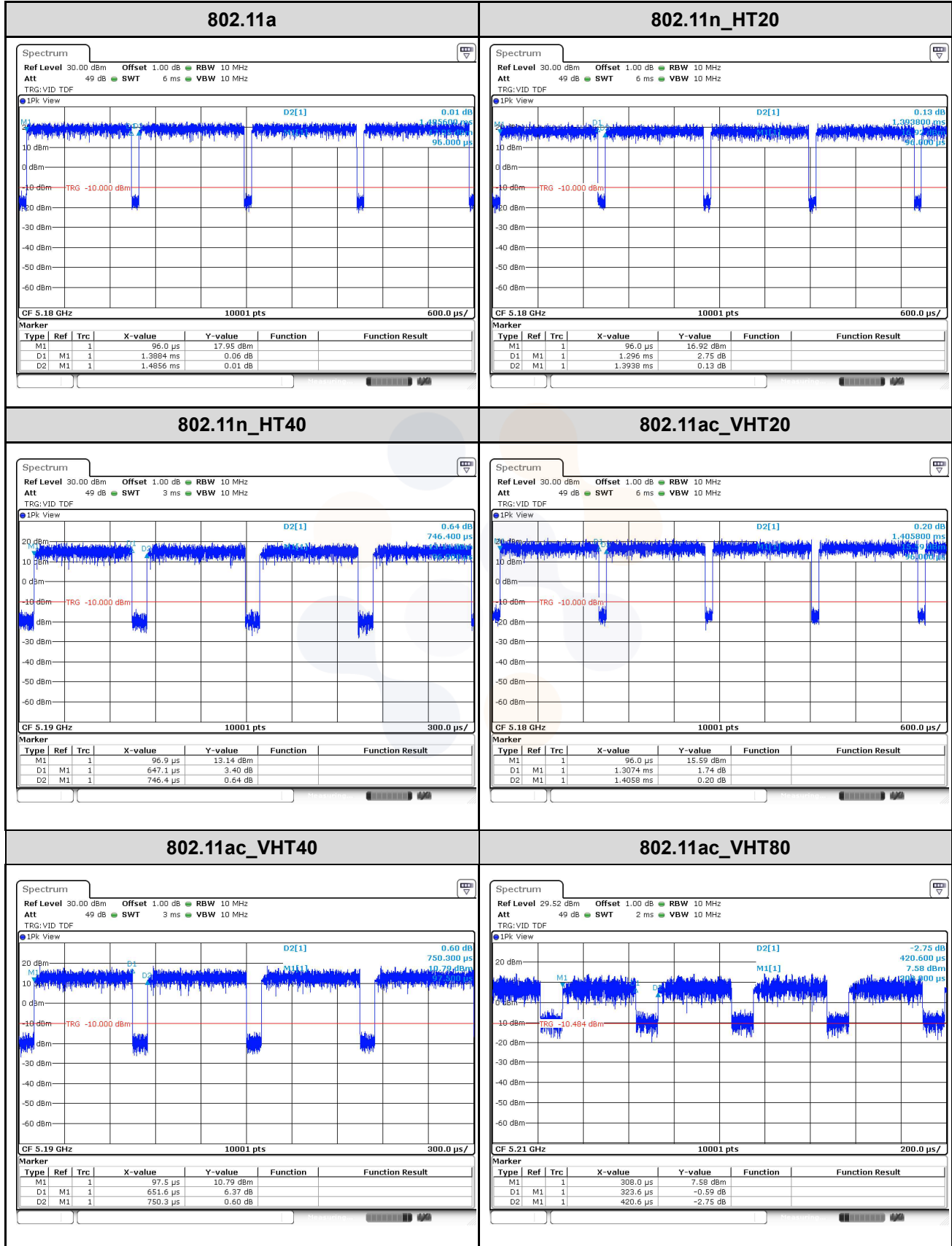
MIMO

Test mode	Period (ms)	T _{on} time (ms)	Duty cycle		Duty cycle factor (dB)
			(Linear)	(%)	
802.11a	1.485	1.388	0.934 7	93.47	0.29
802.11n_HT20	1.393	1.296	0.930 4	93.04	0.31
802.11n_HT40	0.746	0.648	0.868 6	86.86	0.61
802.11ac_VHT20	0.777	0.680	0.875 2	87.52	0.58
802.11ac_VHT40	0.450	0.352	0.782 2	78.22	1.07
802.11ac_VHT80	0.285	0.188	0.659 6	65.96	1.81

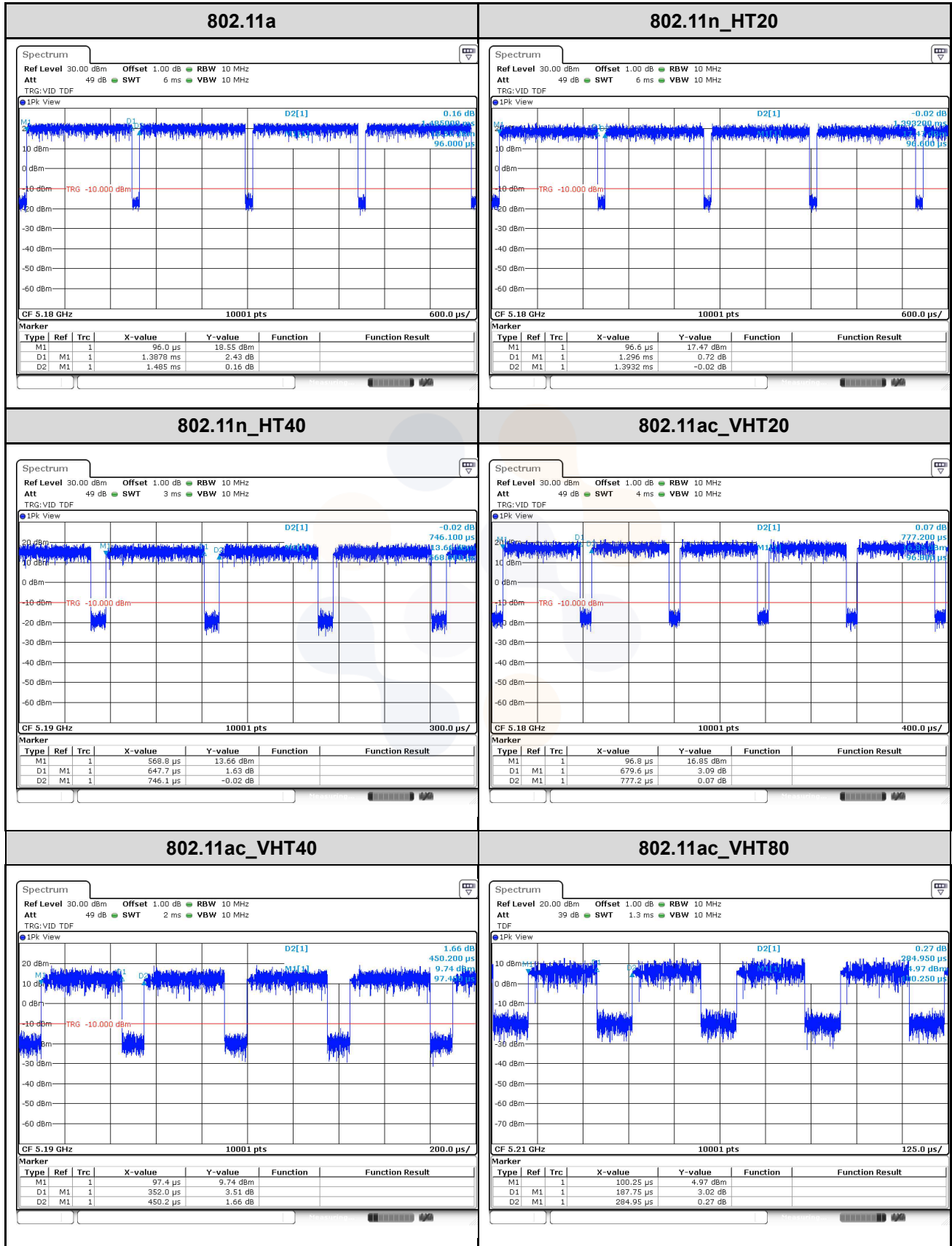
Notes.

1. Duty cycle (Linear) = T_{on} time / Period
2. DCF(Duty cycle factor) = 10log(1/duty cycle)
3. DCF is not compensated to average result if duty cycle is more than 98%

SISO



MIMO



3. Antenna requirement

Requirement of FCC part 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

- The transmitter has permanently attached Metal+LDS Antenna (Internal antenna) on board.
- The E.U.T Complies with the requirement of §15.203, §15.247, §15.407.



3.1 Antenna information

Mode	SISO		CDD	MIMO
	ANT 1	ANT 2	ANT 1 + 2	ANT 1 + 2
802.11a	√	√	√	×
802.11n HT20	√	√	√	√
802.11n HT40	√	√	√	√
802.11ac VHT20	√	√	√	√
802.11ac VHT40	√	√	√	√
802.11ac VHT80	√	√	√	√

√ = Support, × = Not support

3.2 Directional Gain Calculations

According to clause F), 2), d), (i) of KDB 662911 D01 Multiple Transmitter Output, Directional gain may be calculated by using the formulas as below.

Directional Antenna Gain

Band	ANT 1 Gain (dBi)	ANT 2 Gain (dBi)	Power Directional Gain (dBi)
UNII 1	-8.89	-9.78	-6.31
UNII 2A	-8.89	-9.78	-6.31
UNII 2C	-8.70	-9.51	-6.09
UNII 3	-9.03	-9.43	-6.22

Note.

Unequal antenna gains, with equal transmit powers. For antenna gains given by G_1, G_2, \dots, G_N dBi

Directional gain = $10 \log[(10^{G_1/20} + 10^{G_2/20} + \dots + 10^{G_N/20})^2 / N_{ANT}]$ dB i

Sample calculation

In case of UNII 1, directional gain = $10 \log[(10^{-8.89/20} + 10^{-9.78/20})^2 / 2] = -6.31$ dB i

4. Introduction

This report referenced from the FCC ID : A3LSMA346M

Based on their similarity, the FCC Part 15E (equipment class: NII) reuse the original model's result and do spot-check, following the FCC KDB 484596 D01 v01.

And the applicant takes full responsibility that the test data as referenced in this report represent compliance for this FCC ID.

4.1 Difference

The FCC ID: A3LSMA346B shares the same enclosure and circuit board as FCC ID A3LSMA346M. The WIFI/BT/BLE/NFC/WCDMA/GSM/LTE antenna and surrounding circuitry and layout are identical between these two units.

As for all bands, they have been verified and the parent model test results under FCC ID: A3LSMA346M shall remain representative of FCC ID: A3LSMA346B.

Note. The difference between the parent and variant is that the RF circuit for NR/LTE Bands (13/n5/n66), ULCA Band 4 and EN-DC for Band 2/66 in the parent model A3LSMA346M is removed from the variant model A3LSMA346B.

4.2 Spot check verification data (Band-edge & Spurious emission)

Test band	Test item	Test mode	CH	Measured frequency (MHz)	SM-A346M/DSN (dB μ V)		SM-A346B/DSN (dB μ V)		Deviation (dB)	
					Avg	Peak	Avg	Peak	Avg	Peak
UNII-1	Band edge	802.11ac(VHT40) (MIMO)	38	4 500 ~ 5 150	51.73	58.01	42.02	50.09	-9.71	-7.92
	RSE	802.11ac(VHT80) (MIMO)	42	15 681.40	43.67	51.74	42.52	51.66	-1.15	-0.08
UNII-2A	Band edge	802.11n(HT40) (MIMO)	62	5 350 ~ 5 460	51.37	57.01	42.68	51.35	-8.69	-5.66
	RSE	802.11ac(VHT40) (MIMO)	62	16 025.17	43.90	53.36	41.57	52.33	-2.33	-1.03
UNII-2C	Band edge	802.11n(HT40) (MIMO)	102	5 350 ~ 5 460	51.73	55.81	43.45	54.64	-8.28	-1.17
	RSE	802.11n(HT40) (ANT1)	102	16 565.02	-	55.58	-	52.95	-	-2.63
UNII-3	Band edge	802.11ac(VHT80) (ANT2)	155	5 650 ~ 5 725	-	59.85	-	52.94	-	-6.91
	RSE	802.11ac(VHT20) (ANT1)	149	17 316.47	-	53.70	-	52.86	-	-0.84

Notes:

- FCC ID: A3LSMA346B has been verified the performance as for WIFI identical with the FCC ID: A3LSMA346M.
- Comparison of two models, the variant model emissions are less than 3 dB higher than the parent model, and all test results are under FCC technical limits.
- The test procedure(s) in this report were performed in accordance as following.
 - ◆ KDB 484596 D01 v01

4.3 Reference Detail

Reference application that contains the reused reference data in the individual test reports.

Equipment Class	Reference FCC ID	Application Type	Reference Test report Number	Exhibit Type	Variant Test Report Number	Date Re-used
DTS	A3LSMA346M	Original	KR23-SRF0005 (802.11b/g/n)	Test report	KR23-SRF0027	All
			KR23-SRF0004 (Bluetooth LE)	Test report	KR23-SRF0026	All
DSS	A3LSMA346M	Original	KR23-SRF0003 (Bluetooth)	Test report	KR23-SRF0025	All
NII	A3LSMA346M	Original	KP23-SRF0006 (802.11a/n/ac)	Test report	KR23-SRF0028	All
DXX	A3LSMA346M	Original	KP23-SRF0012 (NFC)	Test report	KR23-SRF0033	All
PCE	A3LSMA346M	Original	KR23-SRF0008 (2G, 3G)	Test report	KR23-SRF0030	All
			KR23-SRF0009 (LTE)	Test report	KR23-SRF0031	Partial ^{1),2)}
			KR23-SRF0010 (LTE Part90)	Test report	KR23-SRF0032	All

Notes:

1. This device does not support the LTE Band 13.
2. This device does not support sub antenna for usage of ULCA (LTE B4) and EN-DC (LTE B2/66).
3. This device does not support the 5G NR Bands of n5/n66.

5. Summary of tests

FCC Part section(s)	Parameter	Test Condition	Test results
15.407(b), 15.205(a), 15.209(a)	Spurious emission	Radiated	Pass
	Band-edge, restricted band		Pass

Notes:

- All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
- According to exploratory test no any obvious emission were detected from 9 kHz to 30 MHz. Although these tests were performed other than open field site, adequate comparison measurements were confirmed against 30 m open field site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.
- The fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z. It was determined that **X** orientation was worst-case orientation. Therefore, all final radiated testing was performed with the EUT in **X** orientation
- The maximum production power and tolerance are not impacted by the change. So only spot-check test was done against the worst case from the original model.
- All the radiated tests have been performed several case. (Stand-alone, with accessories (DLC Cable etc.))
 Worst case: stand-alone
- The test procedure(s) in this report were performed in accordance as following.
 - ◆ ANSI C63.10-2013
 - ◆ KDB 789033 D02 v02r01
 - ◆ KDB 662911 D01 v02r01
- Based on the baseline scan, the worst-case data rates were:
 - 802.11a mode: 6Mbps
 - 802.11n HT20 mode: MCS0
 - 802.11n HT40 mode: MCS0
 - 802.11ac VHT20 mode: MCS0
 - 802.11ac VHT40 mode: MCS0
 - 802.11ac VHT80 mode: MCS0

6. Measurement uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013.

All measurement uncertainty values are shown with a coverage factor of $k=2$ to indicated a 95 % level of confidence. The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded uncertainty (\pm)	
Radiated spurious emissions	Below 30 MHz:	2.4 dB
	30 MHz ~ 1 000 MHz	2.3 dB
	1 000 MHz ~ 18 000 MHz	5.6 dB
	Above 18 000 MHz	5.7 dB

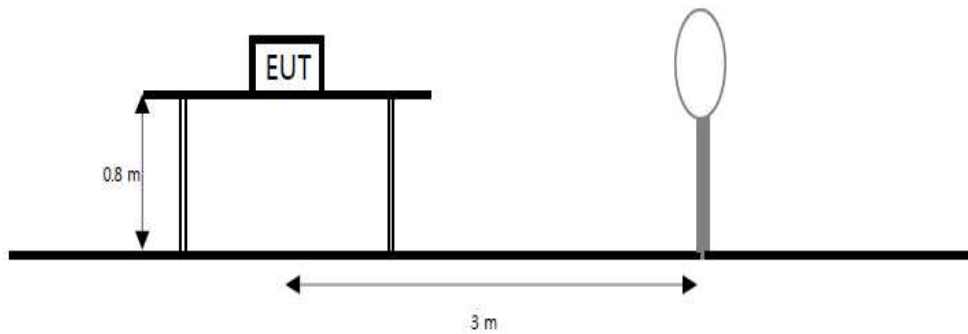


7. Test results

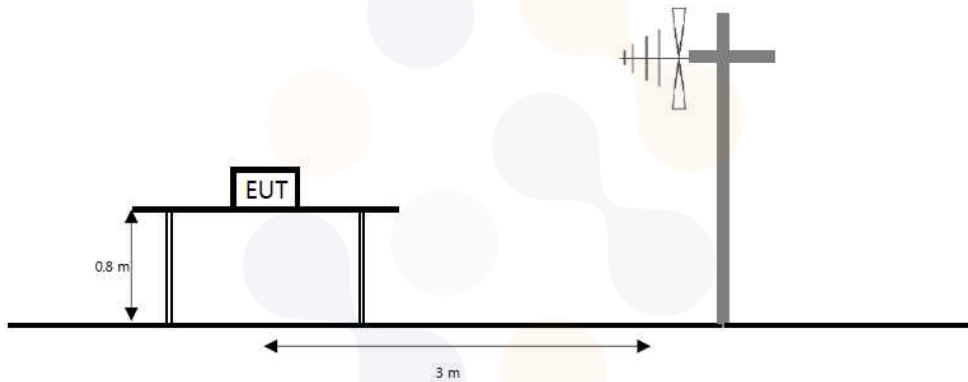
7.1. Spurious Emission, Band Edge and Restricted bands

Test setup

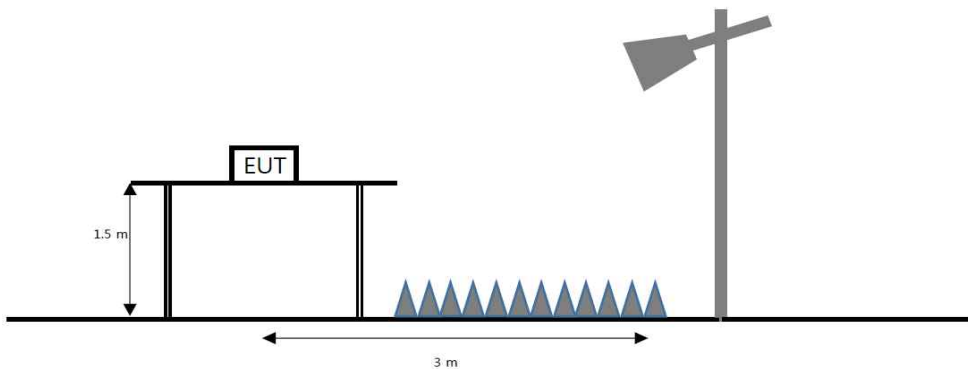
The diagram below shows the test setup that is utilized to make the measurements for emission from 9 kHz to 30 MHz Emissions



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 from 1 GHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz emissions, whichever is lower.



Limit

According to section 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 ($\mu\text{V}/\text{m}$)	Measurement distance (m)
0.009 - 0.490	2 400/F(kHz)	300
0.490 - 1.705	24 000/F(kHz)	30
1.705 - 30	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., Section 15.231 and 15.241.

According to section 15.205(a) and (b) only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.009 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
0.495 - 0.505	16.694 75 - 16.695 25	608 - 614	5.35 - 5.46
2.173 5 - 2.190 5	16.804 25 - 16.804 75	960 - 1 240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1 300 - 1 427	8.025 - 8.5
4.177 25 - 4.177 75	37.5 - 38.25	1 435 - 1 626.5	9.0 - 9.2
4.207 25 - 4.207 75	73 - 74.6	1 645.5 - 1 646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1 660 - 1 710	10.6 - 12.7
6.267 75 - 6.268 25	108 - 121.94	1 718.8 - 1 722.2	13.25 - 13.4
6.311 75 - 6.312 25	123 - 138	2 200 - 2 300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2 310 - 2 390	15.35 - 16.2
8.362 - 8.366	156.524 75 - 156.525	2 483.5 - 2 500	17.7 - 21.4
8.376 25 - 8.386 75	25	2 690 - 2 900	22.01 - 23.12
8.414 25 - 8.414 75	156.7 - 156.9	3 260 - 3 267	23.6 - 24.0
12.29 - 12.293	162.012 5 - 167.17	3 332 - 3 339	31.2 - 31.8
12.519 75 - 12.520 25	167.72 - 173.2	3 345.8 - 3 358	36.43 - 36.5
12.576 75 - 12.577 25	240 - 285	3 600 - 4 400	Above 38.6
13.36 - 13.41	322 - 335.4		

The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in section 15.209. At frequencies equal to or less than 1 000 MHz, compliance with the limits in section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1 000 MHz, compliance with the emission limits in section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in section 15.35 apply to these measurements.

According to section 15.407(b), undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

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 dBm/MHz

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 dBm/MHz.

For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/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 dBm/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 dBm/MHz at the band edge.

Test procedure

ANSI C63.10-2013 Section 12.7.7.2, 12.7.5, 12.7.6
 KDB 789033 D02 v02r01 – Section G
 KDB 291074 D02 v01 – 2.10.2

Test settings

Peak field strength measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = as specified in table
3. VBW ≥ (3×RBW)
4. Detector = peak
5. Sweep time = auto
6. Trace mode = max hold
7. Allow sweeps to continue until the trace stabilizes

Table. RBW as a function of frequency



Frequency	RBW
9 kHz to 150 kHz	200 Hz to 300 Hz
0.15 MHz to 30 MHz	9 kHz to 10 kHz
30 MHz to 1 000 MHz	100 kHz to 120 kHz
> 1 000 MHz	1 MHz

Average field strength measurements

Trace averaging with continuous EUT transmission at full power

If the EUT can be configured or modified to transmit continuously (D ≥ 98%), then the average emission levels shall be measured using the following method (with EUT transmitting continuously):

1. RBW = 1 MHz (unless otherwise specified).
2. VBW ≥ (3×RBW).
3. Detector = RMS (power averaging), if [span / (# of points in sweep)] ≤ (RBW / 2). Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If this condition cannot be satisfied, then the detector mode shall be set to peak.
4. Averaging type = power (i.e., rms):
 - 1) As an alternative, the detector and averaging type may be set for linear voltage averaging.

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- 2) Some instruments require linear display mode to use linear voltage averaging. Log or dB averaging shall not be used.
5. Sweep time = auto.
6. Perform a trace average of at least 100 traces.

Trace averaging across ON and OFF times of the EUT transmissions followed by duty cycle correction

If continuous transmission of the EUT ($D \geq 98\%$) cannot be achieved and the duty cycle is constant (duty cycle variations are less than $\pm 2\%$), then the following procedure shall be used:

1. The EUT shall be configured to operate at the maximum achievable duty cycle.
2. Measure the duty cycle D of the transmitter output signal as described in 11.6.
3. RBW = 1 MHz (unless otherwise specified).
4. VBW $\geq [3 \times \text{RBW}]$.
5. Detector = RMS (power averaging), if $[\text{span} / (\# \text{ of points in sweep})] \leq (\text{RBW} / 2)$. Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If this condition cannot be satisfied, then the detector mode shall be set to peak.
6. Averaging type = power (i.e., rms):
 - 1) As an alternative, the detector and averaging type may be set for linear voltage averaging.
 - 2) Some instruments require linear display mode to use linear voltage averaging. Log or dB averaging shall not be used.
7. Sweep time = auto.
8. Perform a trace average of at least 100 traces.
9. A correction factor shall be added to the measurement results prior to comparing with the emission limit 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:
 - 1) If power averaging (rms) mode was used in step f), then the applicable correction factor is $[10 \log (1 / D)]$, where D is the duty cycle.
 - 2) If linear voltage averaging mode was used in step f), then the applicable correction factor is $[20 \log (1 / D)]$, where D is the duty cycle.
 - 3) If a specific emission is demonstrated to be continuous ($D \geq 98\%$) rather than turning ON and OFF with with the transmit cycle, then no duty cycle correction is required for that emission.

Notes:

1. $f < 30$ MHz, extrapolation factor of 40 dB/decade of distance. $F_d = 40 \log(D_m/D_s)$
 $f \geq 30$ MHz, extrapolation factor of 20 dB/decade of distance. $F_d = 20 \log(D_m/D_s)$
Where:
 F_d = Distance factor in dB
 D_m = Measurement distance in meters
 D_s = Specification distance in meters
2. Factors(dB) = Antenna factor(dB/m) + Cable loss(dB) + or Amp. gain(dB) + or F_d (dB)
3. The worst-case emissions are reported however emissions whose levels were not within 20 dB of respective limits were not reported.
4. Average test would be performed if the peak result were greater than the average limit.
5. ¹⁾ means restricted band.
6. Below 30 MHz frequency range, In order to search for the worst result, all orientations about parallel, perpendicular, and ground-parallel were investigated then reported. when the emission level was higher than 20 dB of the limit, then the following statement shall be made: "No spurious emissions were detected within 20 dB of the limit."

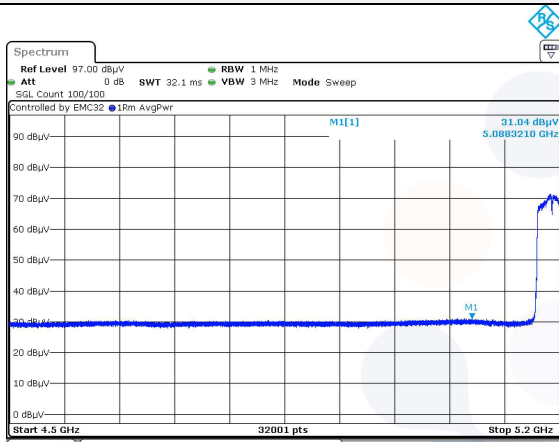
Spot-check Test results

MIMO 802.11ac VHT40 UNII-1 / Band-edge

Lowest Channel (5 190 MHz)

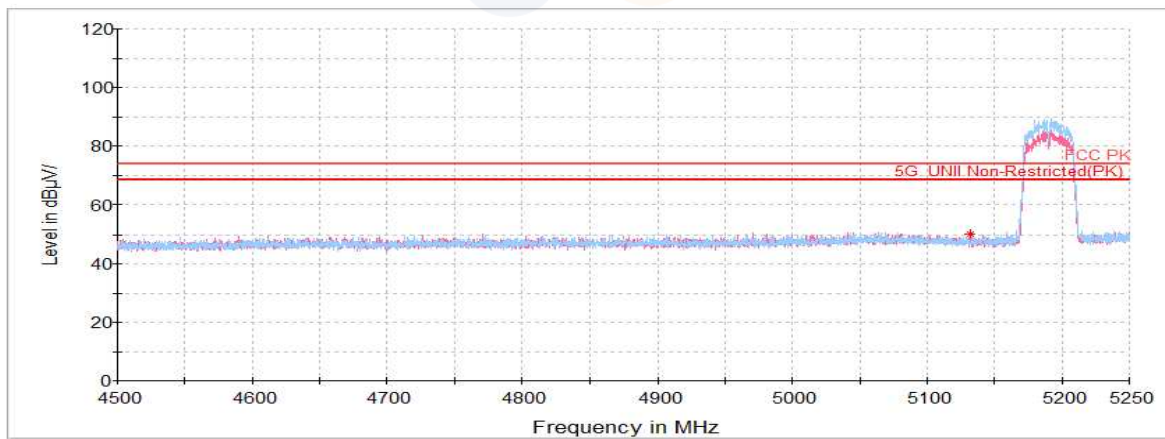
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
5 088.32 ¹⁾	H	40.18	33.81	-23.90	-	50.09	74.00	23.91
Average Data								
5 088.32 ¹⁾	H	31.04	33.81	-23.90	1.07	42.02	54.00	11.98

Average data



Blank

Horizontal/Vertical for Band-edge

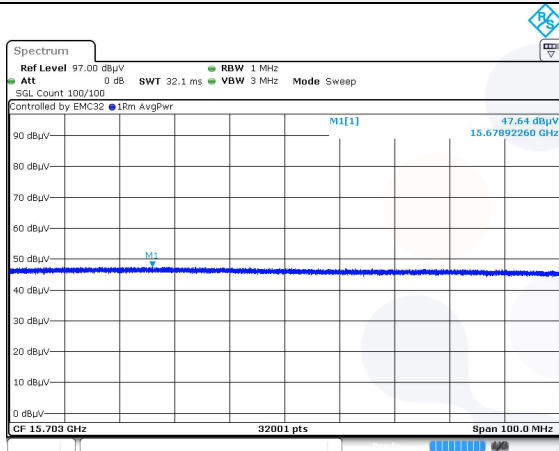


MIMO 802.11ac VHT80 UNII-1 / Harmonic

Middle Channel (5 210 MHz)

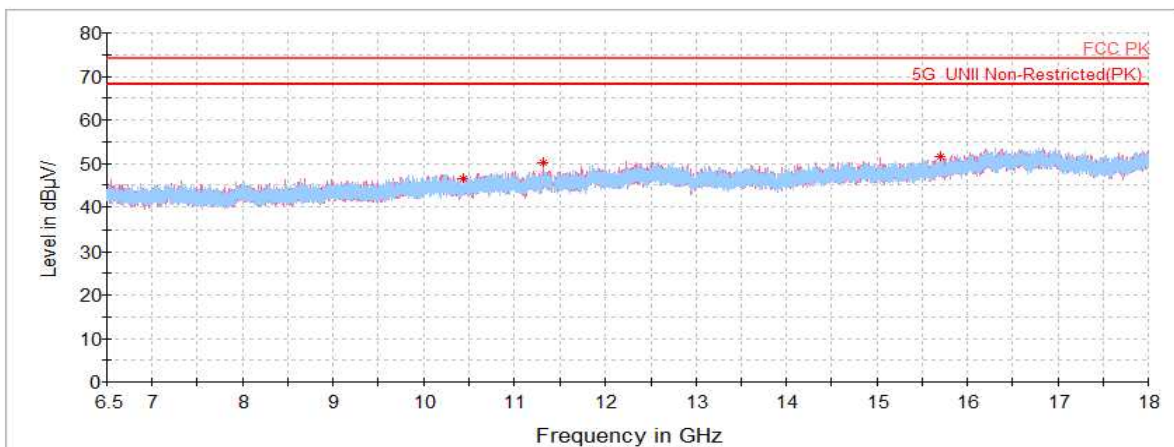
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
10 444.14	H	57.34	37.16	-47.89	-	46.61	68.20	21.59
11 332.52 ¹⁾	V	60.07	37.83	-47.66	-	50.24	74.00	23.76
15 678.92 ¹⁾	V	57.92	40.44	-46.70	-	51.66	74.00	22.34
Average Data								
15 678.92 ¹⁾	V	47.64	40.44	-46.70	1.14	42.52	54.00	11.48

Average data



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Horizontal/Vertical for 6.5 GHz ~ 18 GHz

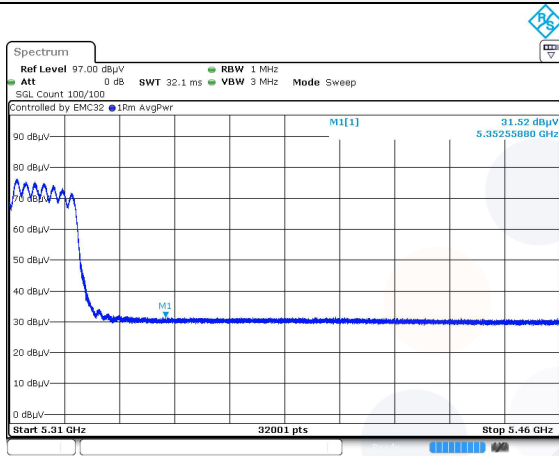


MIMO 802.11n HT40 UNII-2A / Band-edge

Highest Channel (5 310 MHz)

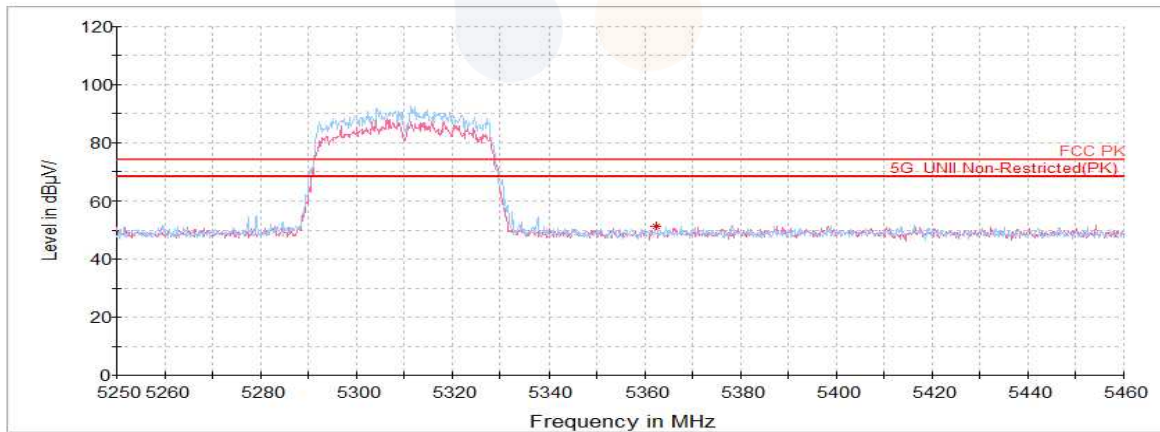
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
5 352.56 ⁽¹⁾	H	40.80	34.12	-23.57	-	51.35	74.00	22.65
Average Data								
5 352.56 ⁽¹⁾	H	31.52	34.12	-23.57	0.61	42.68	54.00	11.32

Average data



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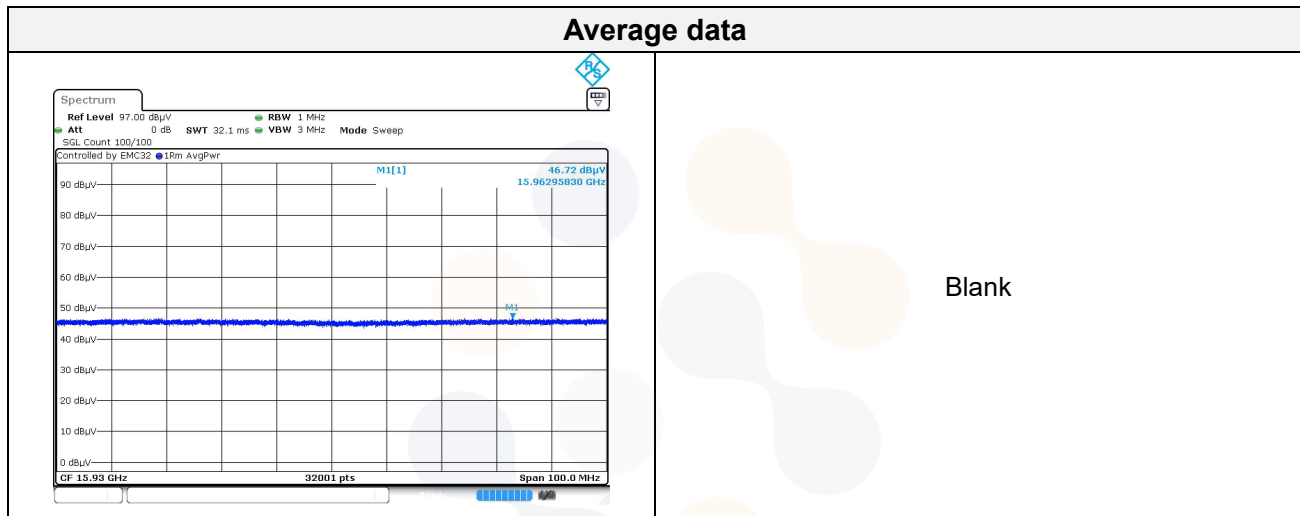
Horizontal/Vertical for Band-edge



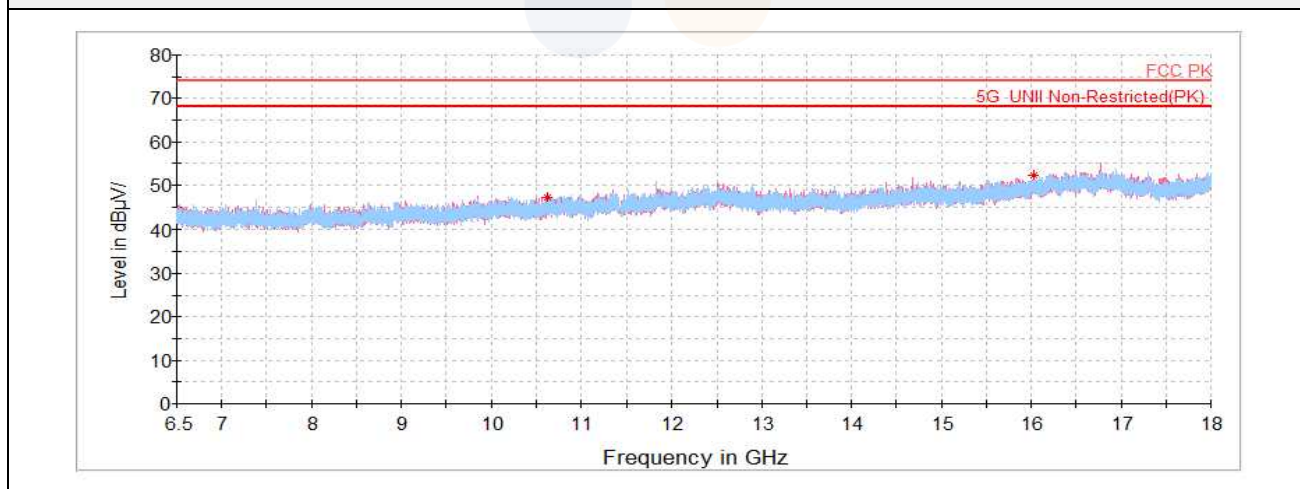
MIMO 802.11ac VHT40 UNII-2A / Harmonic

Highest Channel (5 310 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
10 627.78 ¹⁾	V	57.73	37.28	-47.82	-	47.19	74.00	26.81
15 962.96 ¹⁾	H	58.09	40.67	-46.43	-	52.33	74.00	21.67
Average Data								
15 962.96 ¹⁾	H	46.72	40.67	-46.43	0.61	41.57	54.00	12.43



Horizontal/Vertical for 6.5 GHz ~ 18 GHz

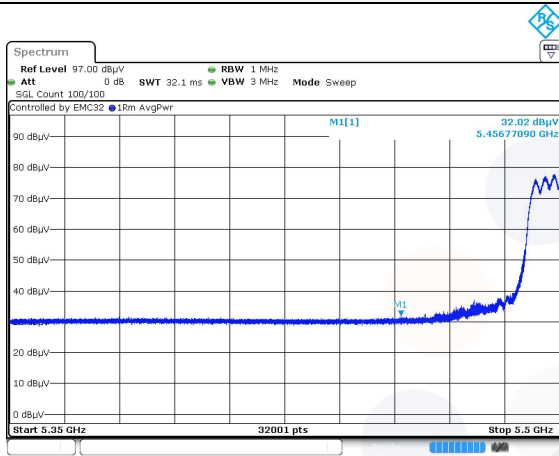


MIMO 802.11n HT40 UNII-2C / Band-edge

Lowest Channel (5 510 MHz)

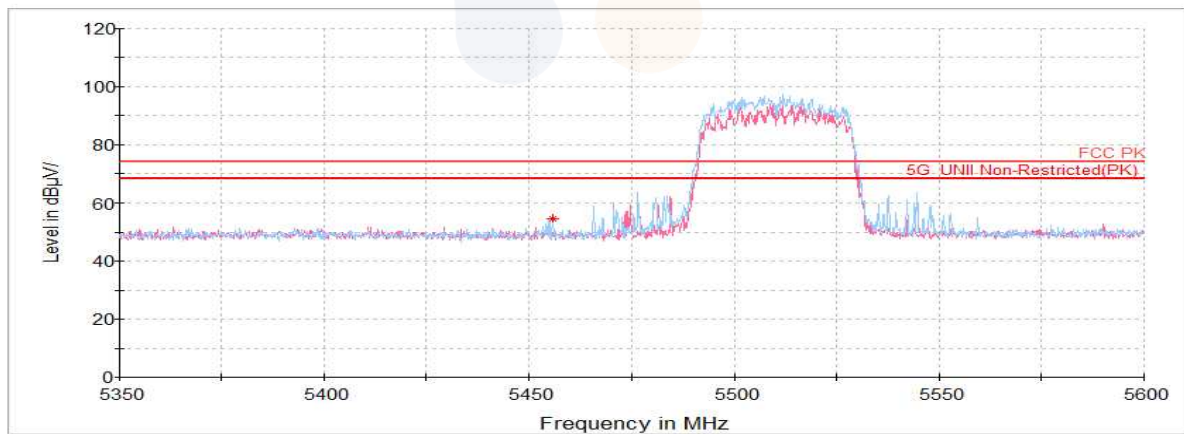
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
5 456.77 ¹⁾	H	43.82	34.25	-23.43	-	54.64	74.00	19.36
Average Data								
5 456.77 ¹⁾	H	32.02	34.25	-23.43	0.61	43.45	54.00	10.55

Average data



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Horizontal/Vertical for Band-edge

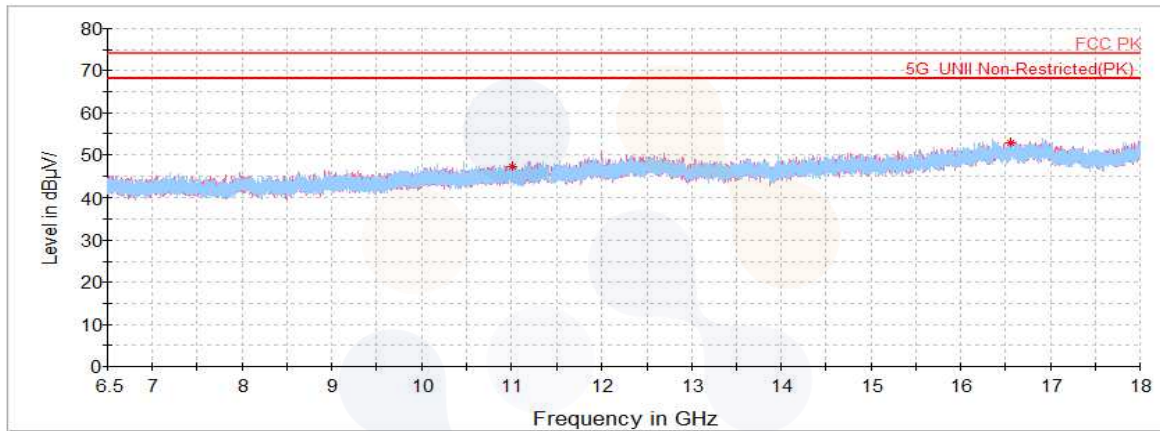


SISO ANT1 802.11n HT40 UNII-2C / Harmonic

Lowest Channel (5 510 MHz)

Frequency (MHz)	Pol. (V/H)	Reading (dB(μV))	Ant. Factor (dB)	Amp.+Cable (dB)	DCF (dB)	Result (dB(μV/m))	Limit (dB(μV/m))	Margin (dB)
Peak data								
11 019.50 ¹⁾	V	57.41	37.52	-47.69	-	47.24	74.00	26.76
16 559.63	V	55.14	42.30	-44.49	-	52.95	68.20	15.25
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

Horizontal/Vertical for 6.5 GHz ~ 18 GHz

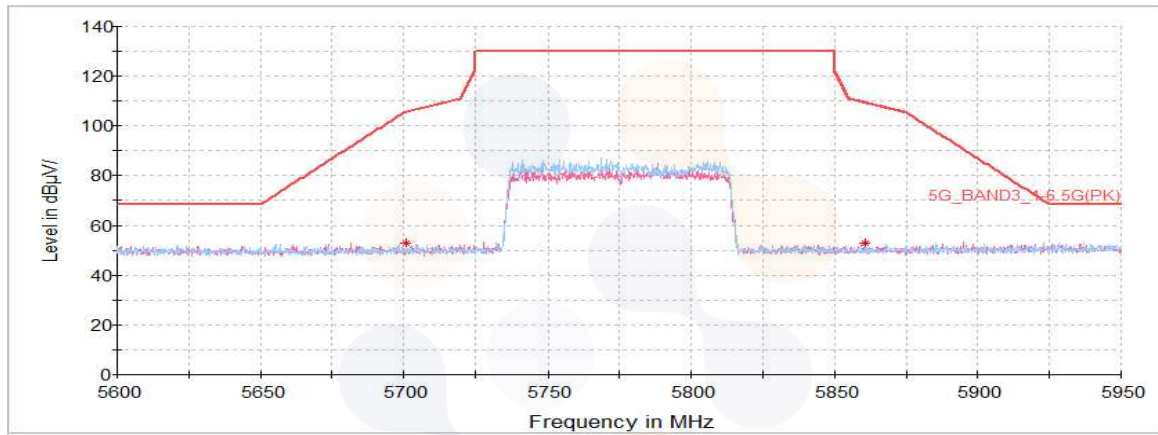


SISO ANT2 802.11ac VHT80 UNII-3 / Band-edge

Middle Channel (5 775 MHz)

Frequency (MHz)	Pol. (V/H)	Reading (dB(μV))	Ant. Factor (dB)	Amp.+Cable (dB)	DCF (dB)	Result (dB(μV/m))	Limit (dB(μV/m))	Margin (dB)
Peak data								
5 701.13	H	41.33	34.66	-23.05	-	52.94	105.52	52.57
5 860.80	H	41.07	34.95	-22.81	-	53.21	109.18	55.97
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

Horizontal/Vertical for Band-edge

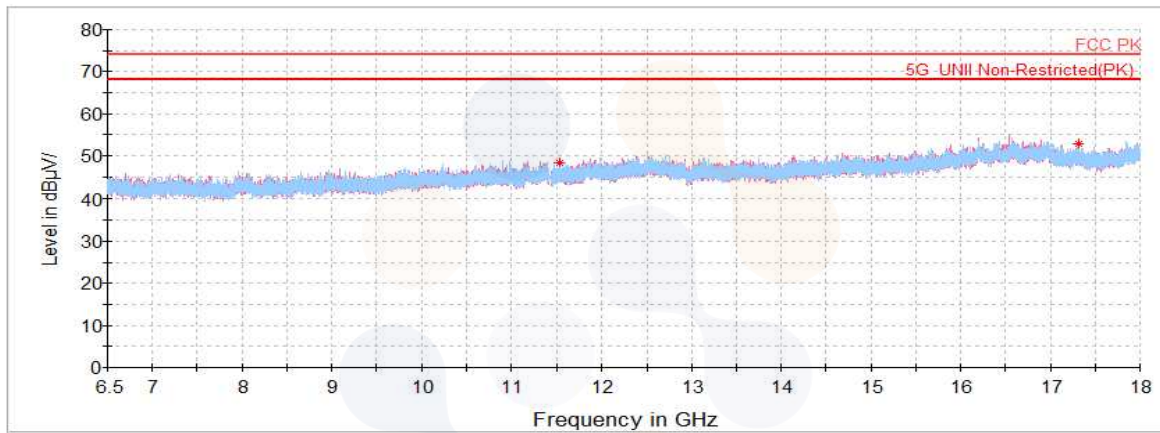


SISO ANT1 802.11ac VHT20 UNII-3 / Harmonic

Lowest Channel (5 745 MHz)

Frequency (MHz)	Pol. (V/H)	Reading (dB(μV))	Ant. Factor (dB)	Amp.+Cable (dB)	DCF (dB)	Result (dB(μV/m))	Limit (dB(μV/m))	Margin (dB)
Peak data								
11 528.38 ¹⁾	H	57.92	38.02	-47.65	-	48.29	74.00	25.71
17 312.52	V	56.55	41.39	-45.08	-	52.86	68.20	15.34
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

Horizontal/Vertical for 6.5 GHz ~ 18 GHz



8. Measurement equipment

Equipment Name	Manufacturer	Model No.	Serial No.	Next Cal. Date
Spectrum Analyzer	R&S	FSV40	100989	23.10.14
Power Sensor	R&S	NRP-Z81	1137.9009.02-106225-JM	23.05.02
Horn antenna	ETS.lindgren	3117	155787	23.09.29
Horn antenna	ETS.lindgren	3116	00086635	23.05.04
Attenuator	API Inmet	40AH2W-10	12	23.05.03
AMPLIFIER	B&Z Technologies	BZRT-00504000-481055-382525	26299-27735	23.09.19
AMPLIFIER	B&Z Technologies	BZR-0050400-551028-252525	27736	23.09.19
Antenna Mast	Innco Systems	MA4640-XP-ET	-	-
Turn Table	Innco Systems	CO3000	1175/45850319/P	-
High pass Filter	WT	WT-A1698-HS	WT160411001	23.05.03
Vector Signal Generator	R&S	SMBV100A	257566	23.07.04
Signal Generator	R&S	SMB100A	176206	23.01.19

End of test report