

EVALUATION REPORT

Applicant Name:

SAMSUNG Electronics Co., Ltd.

Date of Issue:

January 13, 2020

Location:

HCT CO., LTD.,

Address:129, Samsung-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Rep. of Korea74, Seoicheon-ro 578beon-gil, Majang-myeon,
Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA

FCC ID:	A3LSMG715U
IC:	649E-SMG715W
APPLICANT:	SAMSUNG Electronics Co., Ltd.

Equipment Class(es) : DSS, DTS, NII, DXX

Rule Part(s) : 15.247, 15.407, 15.248, 15.225

IC Part(s) : RSS-Gen Issue5, RSS-247 Issue 2, RSS-210 Issue 10

Application's Statement : The applicant takes full responsibility that the test data referenced below represents compliance for this FCC ID/IC.

Differences
Brief Description : Hardware and software of this device are identical to the implementation in A3LSMG715FN. The operational description includes detailed information about the changes between the devices. The data from that application has been verified through appropriate spot checks to demonstrate compliance for this device as shown in the summary table below.

Test Reference : KDB 484596 D01 Reference Test Data v01

The detail test data can be found in this documents, Appendix A

Category	Spot Check	Verdict
Unlicensed EMC	Band Edge	Share
	Spurious Emissions	Share

Reference Detail Section

Reference	Equipment Class	Report Title	Section
FCC ID : A3LSMG715FN	DSS	Bluetooth Report	All sections
	DTS	WLAN DTS Report	All sections
		BT LE Report	All sections
	NII	NII Test Report	All sections
	DXX	ANT+ Report	All sections
		NFC Report	All sections



Report prepared by : Jeong Ho Kim
Engineer of Telecommunication testing center



Approved by : Kwon Jeong
Manager of Telecommunication testing center

1. Summary of the spot check for Unlicensed EMC

Mod	Test Item	Mod/ Channel	Measured Frequency [MHz]	SM-G715FN/DS Result [dBuV/m]		SM-G715U1 Result [dBuV/m]		Deviation (dB)	
				Peak	Average	Peak	Average	Peak	Average
BT	Band Edge	2-DH5/ch.78	2483.5 MHz ~2500 MHz	63.63	38.90	65.45	40.72	1.82	1.82
	RSE	2-DH5/ch.39	7323 MHz	60.90	46.43	60.38	46.69	-0.52	0.26
BT(LE)	Band Edge	LE(5.0) 2M 37byte/ch.39	2483.5 MHz~2500 MHz	55.59	47.69	57.55	48.64	1.96	0.95
	RSE	LE(5.0) 2M 37byte/ch.19	7320 MHz	60.58	47.94	60.23	47.76	-0.35	-0.18
DTS	Band Edge	802.11g_ 6Mbps/ch.13	2483.5 MHz~2500 MHz (2484MHz)	62.99	51.78	62.97	51.95	-0.02	0.17
	RSE	802.11n(20M) MCS0/ch.6	7311 MHz	61.45	48.43	60.49	48.30	-0.96	-0.13
UNII	Band Edge	802.11ac(80M)_ 6Mbps/ch.42	4500 MHz~5150 MHz	66.30	51.94	61.48	47.31	-4.82	-4.63
	RSE	802.11ac(20M)_ MCS0/ch.165	17475 MHz	65.07	-	63.77	-	-1.30	-
NFC	Field Strength	With Tag mode	13.56 MHz	17.15	-	14.45	-	-2.70	-
	RSE	With Tag mode	38.389 MHz	28.77	-	28.15	-	-0.62	-
ANT+	Band Edge	Period 128(0dBm)/ch.0	2310.0 MHz~2400.0 MHz	59.53	27.65	59.93	28.05	0.40	0.40
	RSE	Period 128(0dBm)/ch.39	7323 MHz	60.45	49.02	60.47	49.02	0.02	0.00
	Field Strength	Period 128(0dBm)/ch.78	2480 MHz	82.66	50.78	82.53	50.65	-0.13	-0.13

2. List of test equipment for unlicensed EMC

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Innco system	CO3000 / Controller(Antenna mast)	N/A	N/A	CO3000-4p
Innco system	MA4640/800-XP-EP / Antenna Position Tower	N/A	N/A	N/A
Audix	EM1000 / Controller	N/A	N/A	060520
Audix	Turn Table	N/A	N/A	N/A
Rohde & Schwarz	Loop Antenna	08/23/2018	Biennial	1513-175
Schwarzbeck	VULB 9168 / Hybrid Antenna	08/31/2018	Biennial	00895
Schwarzbeck	VULB 9168 / Hybrid Antenna	08/09/2018	Biennial	3368
Schwarzbeck	BBHA 9120D / Horn Antenna	06/28/2019	Biennial	1300
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	04/29/2019	Biennial	BBHA9170342
Rohde & Schwarz	FSP(9 kHz ~ 40 GHz) / Spectrum Analyzer	07/16/2019	Annual	100843
Wainwright Instruments	WHK3.0/18G-10EF / High Pass Filter	01/03/2019	Annual	F6
Wainwright Instruments	WHFX7.0/18G-8SS / High Pass Filter	05/03/2019	Annual	29
Wainwright Instruments	WRCJV2400/2483.5-2370/2520-60/12SS / Band Reject Filter	06/19/2019	Annual	2
Wainwright Instruments	WRCJV5100/5850-40/50-8EEK / Band Reject Filter	02/15/2019	Annual	1
Weinschel	2-3 / Attenuator (3 dB)	10/08/2019	Annual	BR0617
H+S	5910-N-50-010 / Attenuator(10 dB)	10/29/2019	Annual	None
CERNEX	CBLU1183540B-01 / Power Amplifier	12/20/2019	Annual	25540
CERNEX	CBL06185030 / Power Amplifier	03/26/2019	Annual	28550
CERNEX	CBL18265035 / Power Amplifier	01/03/2019	Annual	22966
CERNEX	CBL26405040 / Power Amplifier	06/18/2019	Annual	25956
TESCOM	TC-3000C / Bluetooth Tester	03/26/2019	Annual	3000C000276

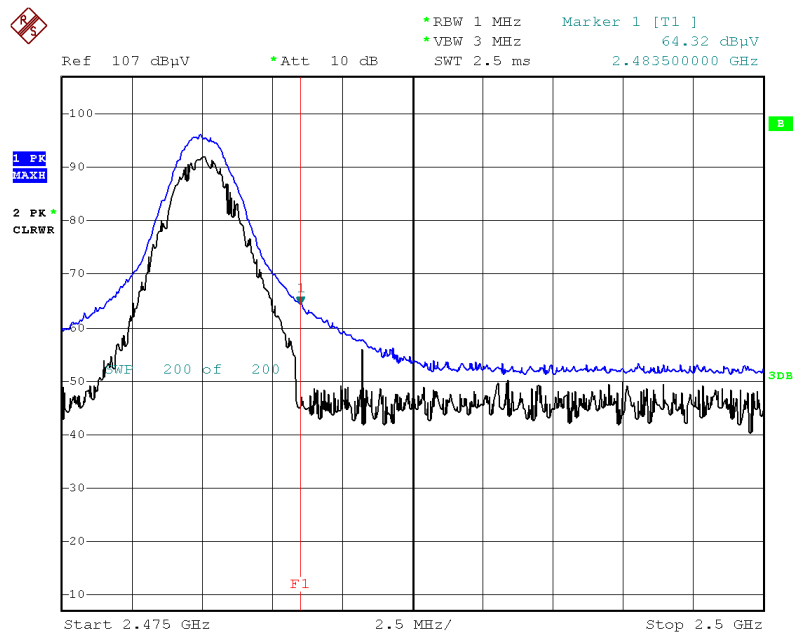
3. Test Plot

BT Band Edge (2-DH5/ch.78)

Bandedge

Frequency [MHz]	Reading [dBuV]	A.F+C.L- AMP+ATT+D.F [dB]	Pol. [H/V]	Duty Cycle Correction [dB]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2483.5	64.32	1.13	H	0	65.45	73.98	8.53	PK
2483.5	64.32	1.13	H	-24.73	40.72	53.98	13.26	AV

[Radiated Restricted Band Edges plot]



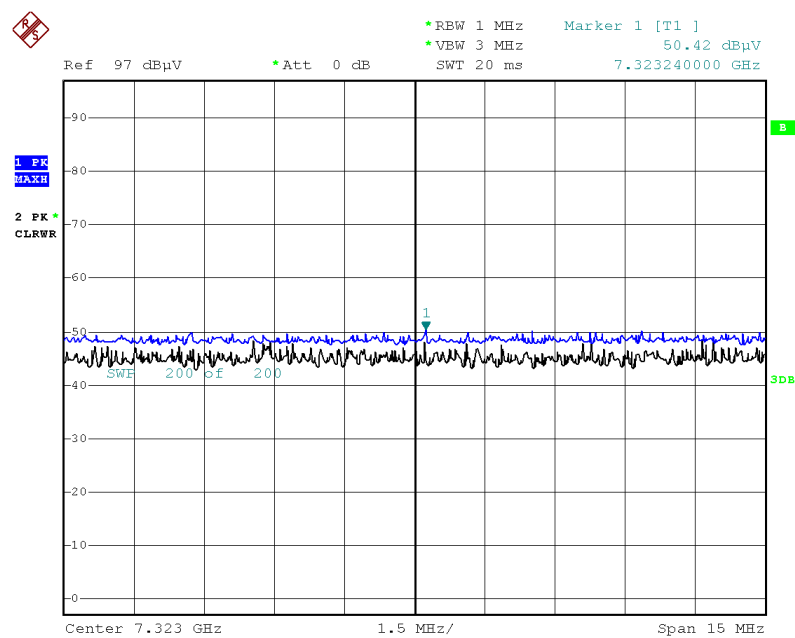
Date: 8.JAN.2020 11:29:52

BT R.S.E 3rd Harmonic(2-DH5/ch.39)

RSE

Frequency	Reading	AN.+CL-AMP G	Pol.	Total	Limit	Margin	Measurement
[MHz]	[dBuV]	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	Type
7323	50.42	9.96	H	60.38	73.98	13.60	PK
7323	36.73	9.96	H	46.69	53.98	7.29	AV

[Radiated Spurious Emissions plot – Peak Reading]



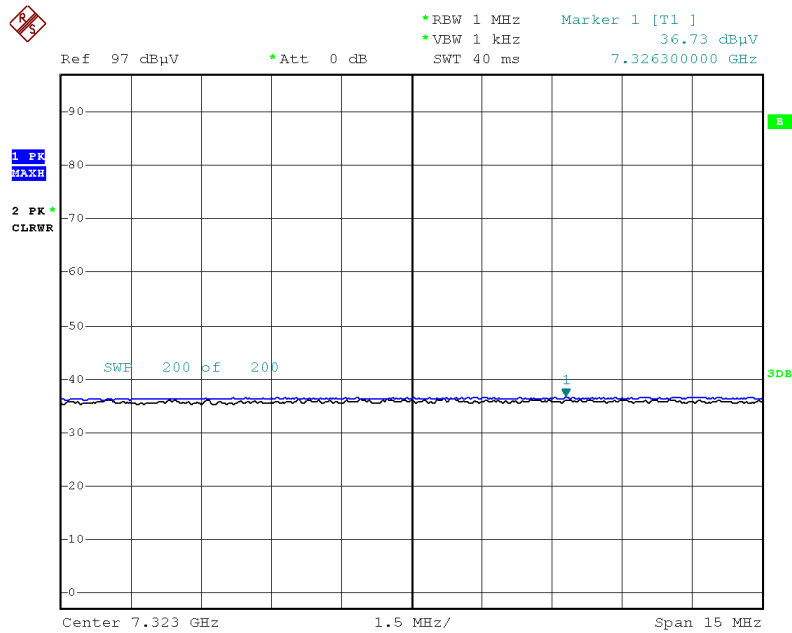
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HCT CO.,LTD. 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA

TEL: +82-31-645-6300 FAX: +82-31-645-6401

[Radiated Spurious Emissions plot – Average Reading]



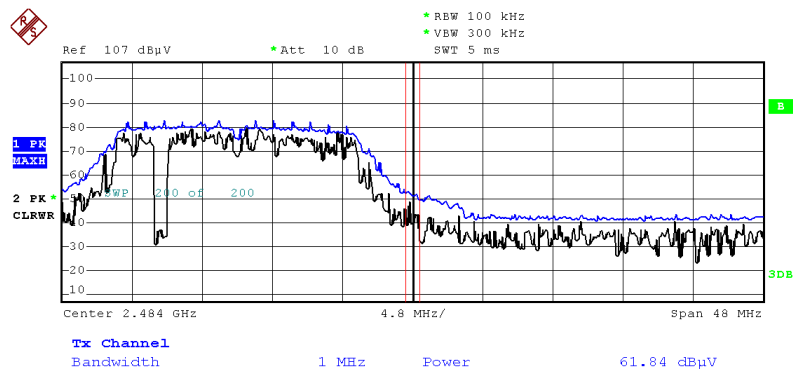
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DTS Band Edge (802.11g_MCS6/ch.13)

Bandedge

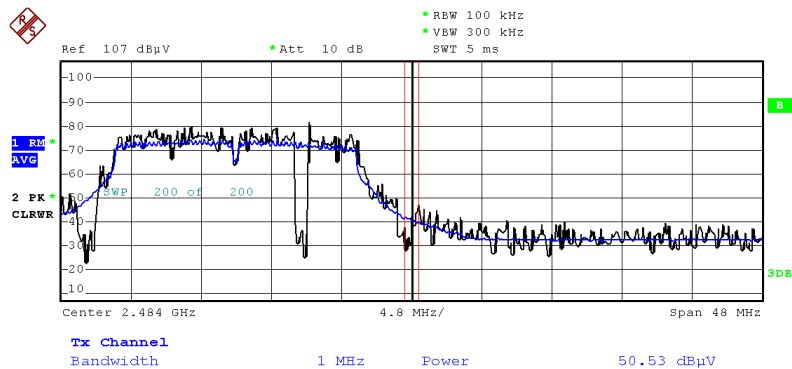
Frequency	Reading	Duty Cycle	A.F.+C.L.-A.G+D.F.	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBuV]	Factor [dB]	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	Type
2483.5*(2484)	61.84	0.00	1.13	V	62.97	73.98	11.01	PK
2483.5*(2484)	50.53	0.29	1.13	V	51.95	53.98	2.03	AV

[Radiated Restricted Band Edges plot – Peak Reading]



Date: 30.DEC.2019 09:20:13

[Radiated Restricted Band Edges plot – Average Reading]



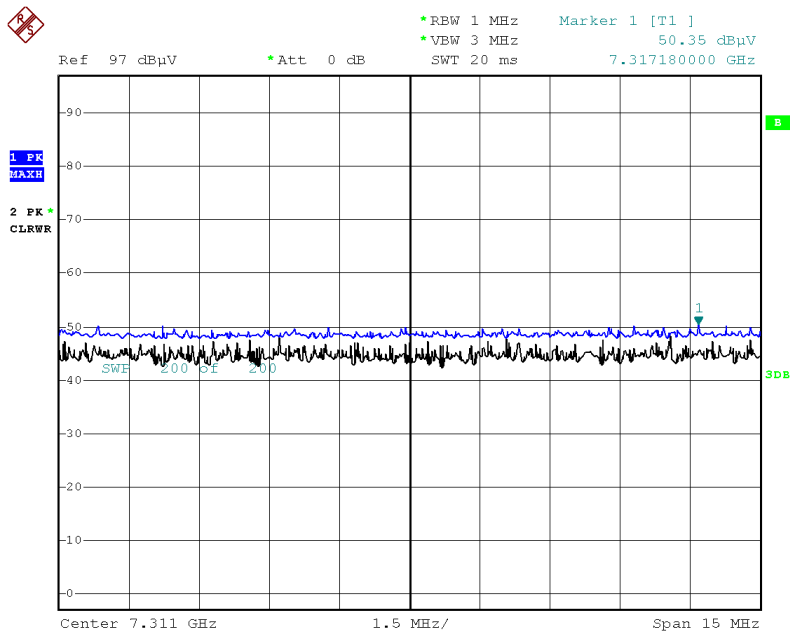
Date: 30.DEC.2019 09:19:24

DTS R.S.E 3rd Harmonic (802.11n(20M) 6.5Mbps/ch.6)

RSE

Frequency	Reading	AN.+CL-AMP G	Pol.	Total	Limit	Margin	Measurement
[MHz]	[dBuV]	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	Type
7311	50.35	0.00	10.14	H	60.49	73.98	13.49
7311	37.84	0.32	10.14	H	48.30	53.98	5.68

[Radiated Spurious Emissions plot – Peak Reading]



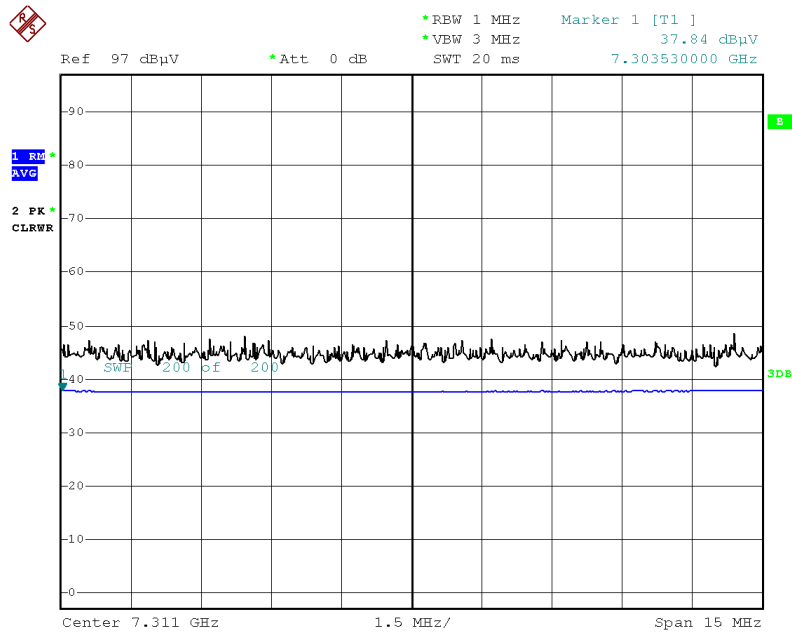
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TEL: +82-31-645-6300 FAX: +82-31-645-6401

[Radiated Spurious Emissions plot – Average Reading]

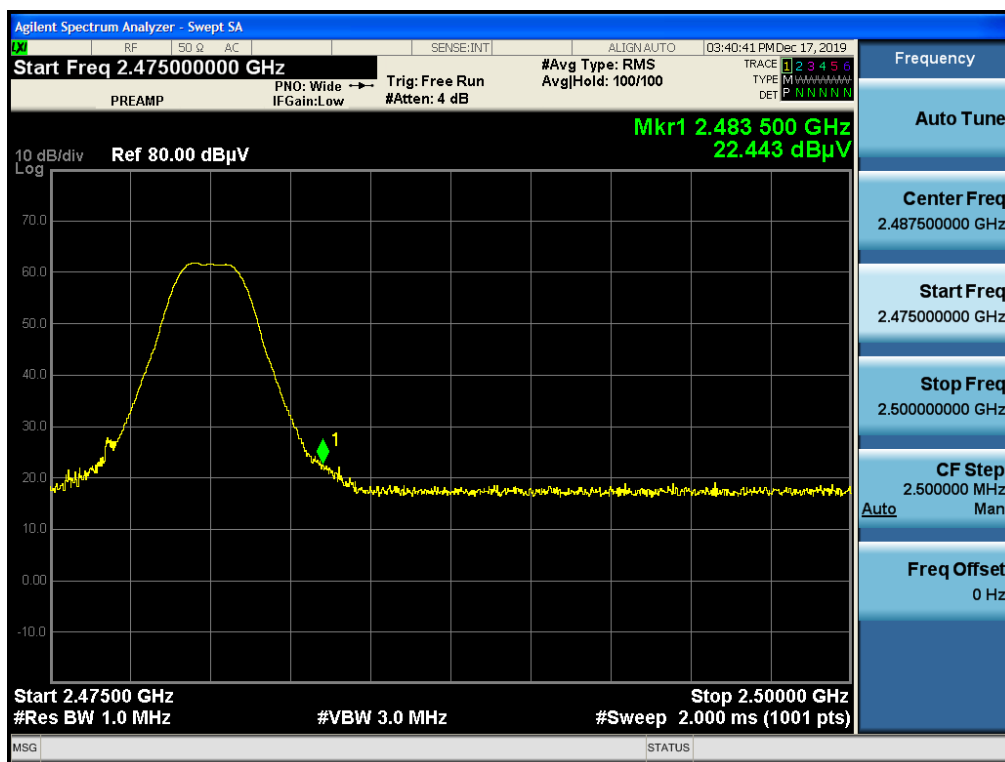


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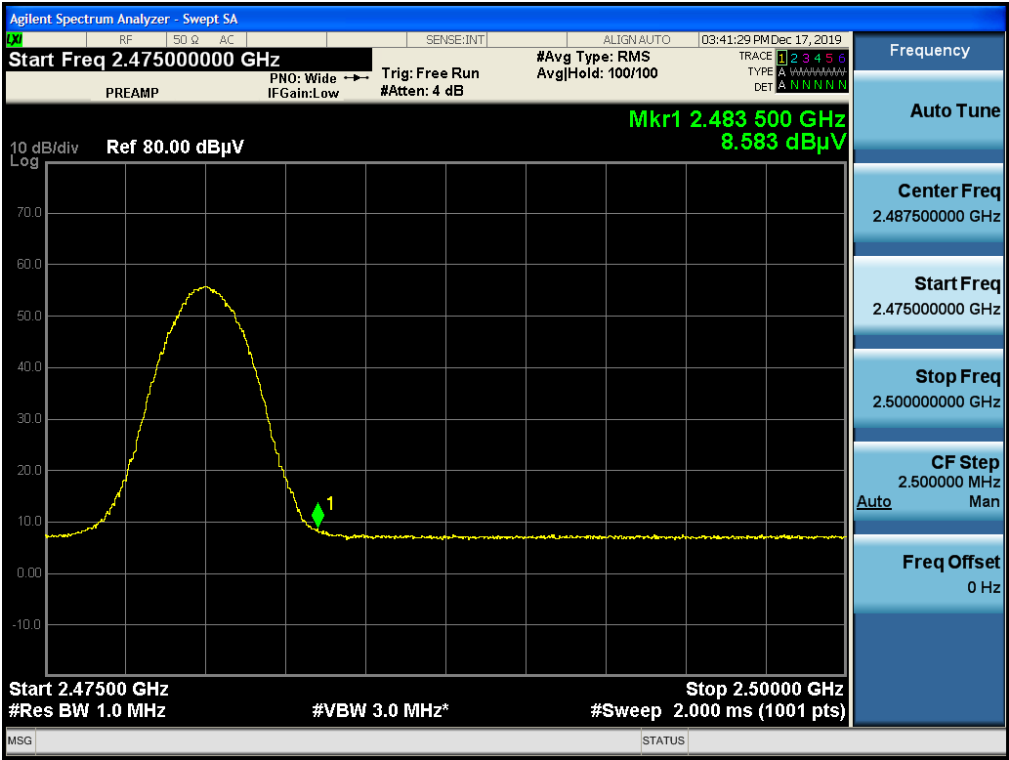
BT(LE) Band Edge (LE(5.0) 2M 37byte/ch.39)**Bandedge**

Frequency	Reading	Duty cycle						Measurement
Factor	Type							
[MHz]	[dBuV]	[dB]	A.F.+CL	Pol.	Total	Limit	Margin	
			[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	
2483.5	22.44	0.00	35.11	H	57.55	73.98	16.43	PK
2483.5	8.58	4.95	35.11	H	48.64	53.98	5.34	AV

[Radiated Restricted Band Edges plot – Peak Reading]



[Radiated Restricted Band Edges plot – Average Reading]



BT(LE) R.S.E 3rd Harmonic (LE(5.0) 2M 37byte/ch.19)

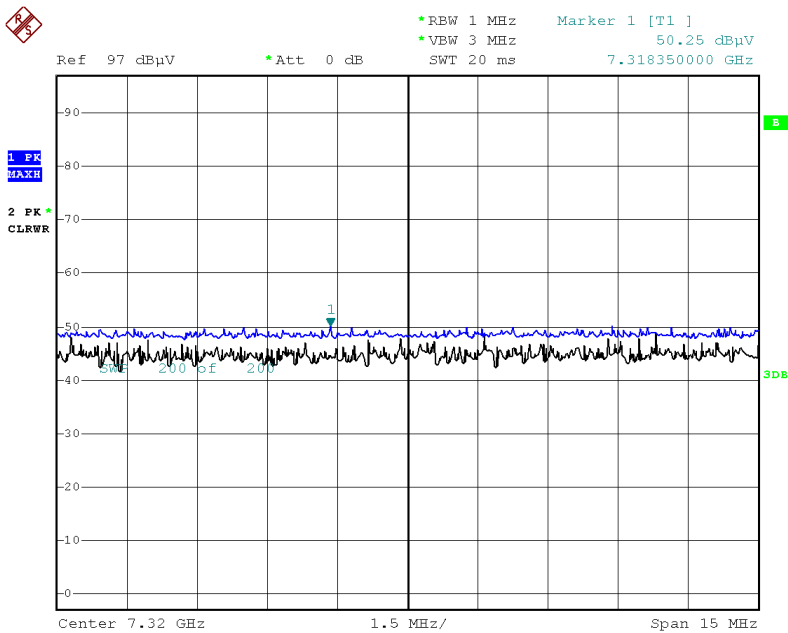
RSE

Frequency	Reading	Duty cycle						Measurement
		Factor	AN.+CL-AMP G	Pol.	Total	Limit	Margin	Type
[MHz]	[dBuV]	[dB]	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	
7320	50.25	0.00	9.98	H	60.23	73.98	13.75	PK
7320	37.78	0.00	9.98	H	47.76	53.98	6.22	AV

Note:

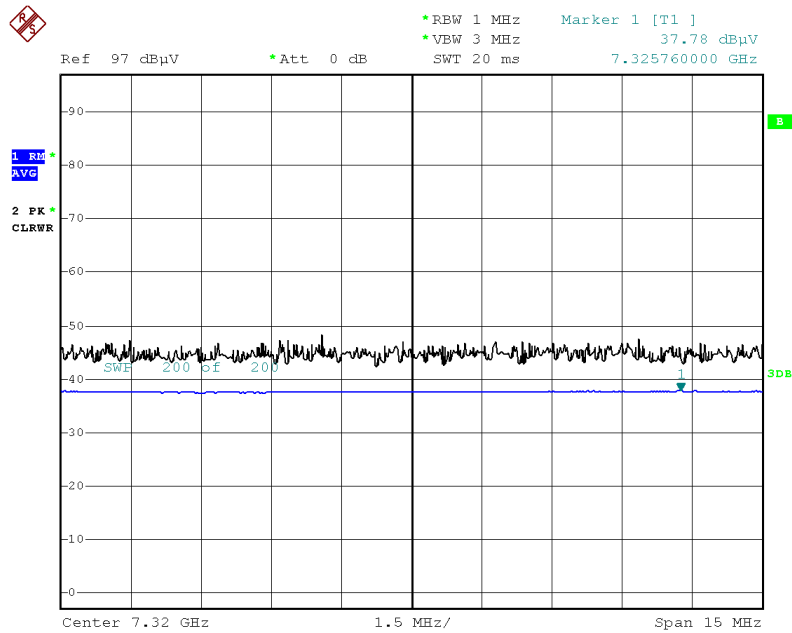
1. Reading value is ambient level measurement, this reason not add the duty cycle factor for final result.

[Radiated Spurious Emissions plot – Peak Reading]



Date: 16.DEC.2019 14:36:45

[Radiated Spurious Emissions plot – Average Reading]



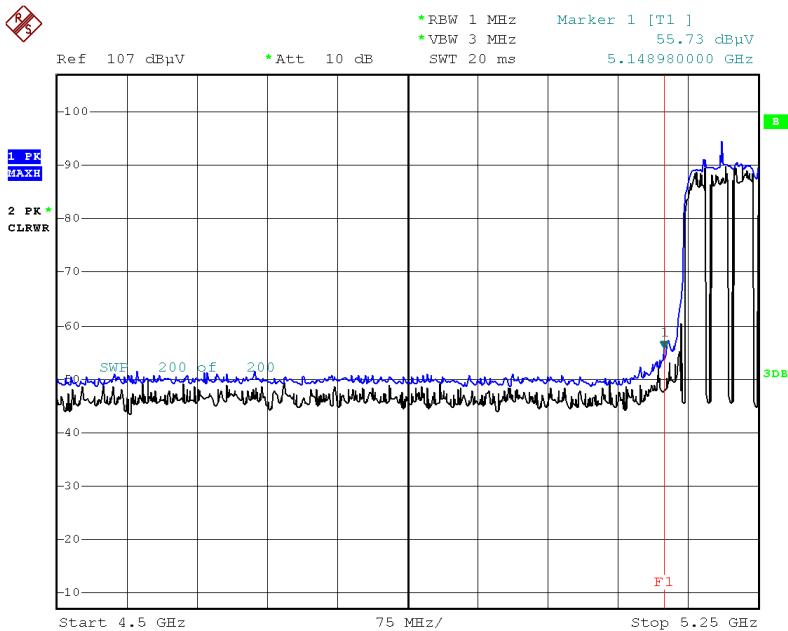
Date: 16.DEC.2019 14:37:27

U-NII Band Edge (802.11ac_80MHz MCS0/ch.42)

Bandedge

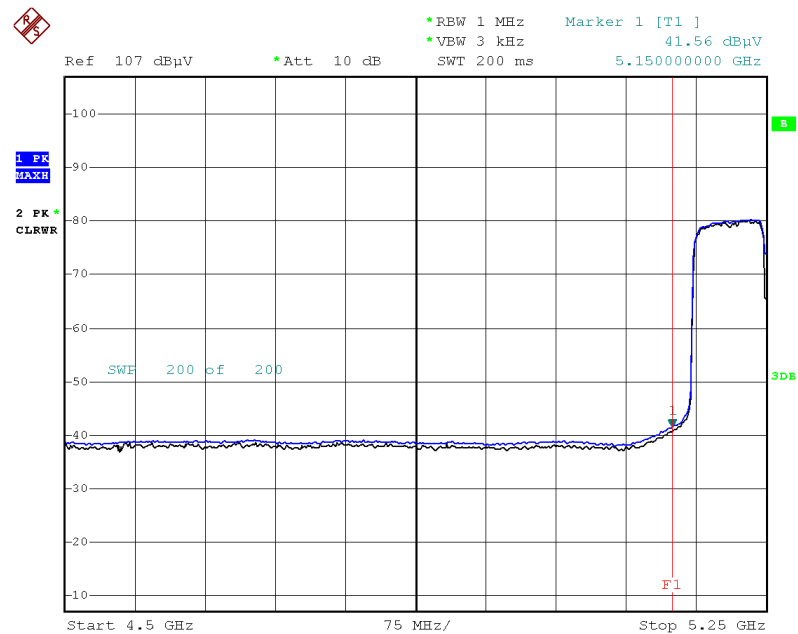
Frequency	Reading	AN.+CL-AMP+ATT.					Measurement
Frequency	Reading	+D.F.	ANT. POL	Total	Limit	Margin	Type
[MHz]	[dBuV]	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	
5150	55.73	5.75	V	61.48	73.98	12.50	PK
5150	41.56	5.75	V	47.31	53.98	6.67	AV

Radiated Restricted Band Edges plot – Peak Reading



Date: 29.DEC.2019 13:59:51

Radiated Restricted Band Edges plot – Average Reading



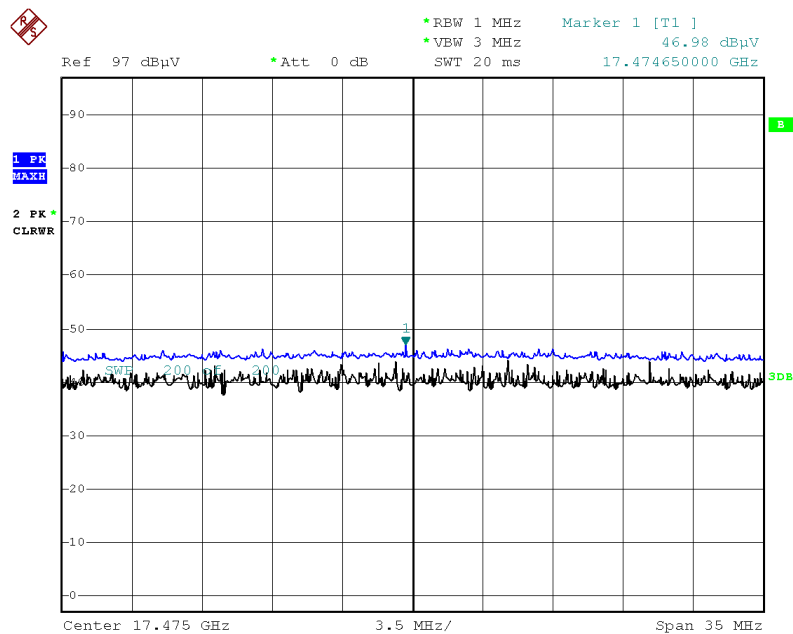
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U-NII R.S.E 3rd Harmonic (802.11ac_20MHz MCS0/ch.165)

RSE

Frequency	Reading	A.F.+C.L.-A.G+D.F.	Pol.	Total	Limit	Margin	Measurement
[MHz]	[dBuV]	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	Type
17475	46.98	16.79	H	63.77	68.20	4.43	PK

Radiated Spurious Emissions plot – Peak Reading



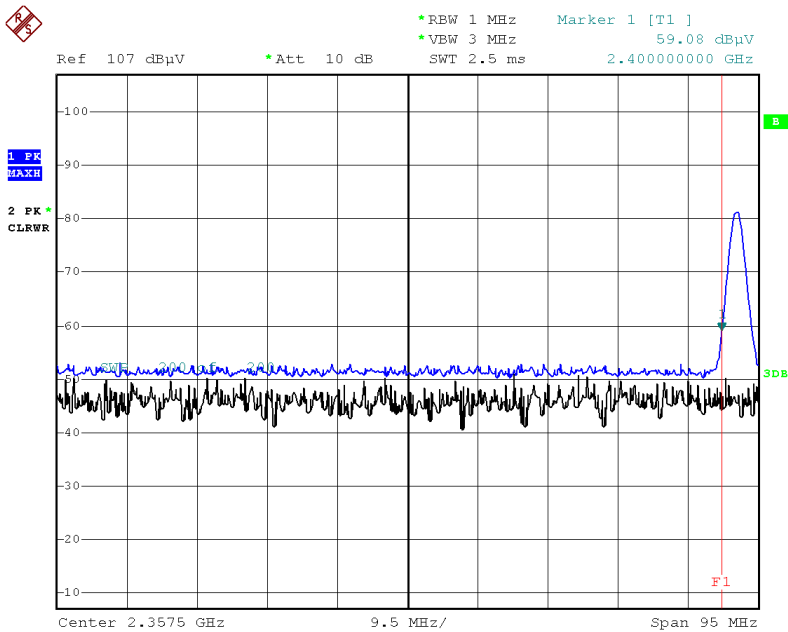
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ANT+ Band Edge (Period 128(0dBm)/ch.0

Bandedge

Frequency [MHz]	Reading [dBuV]	A.F + C.L - A.G + D.F+ ATT [dB]	Pol. [H/V]	D.C.C.F [dB]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2400.0	59.08	0.85	H	0	59.93	73.98	14.05	PK
2400.0	59.08	0.85	H	-31.88	28.05	53.98	25.93	AV

Radiated Restricted Band Edges plot – Peak Reading



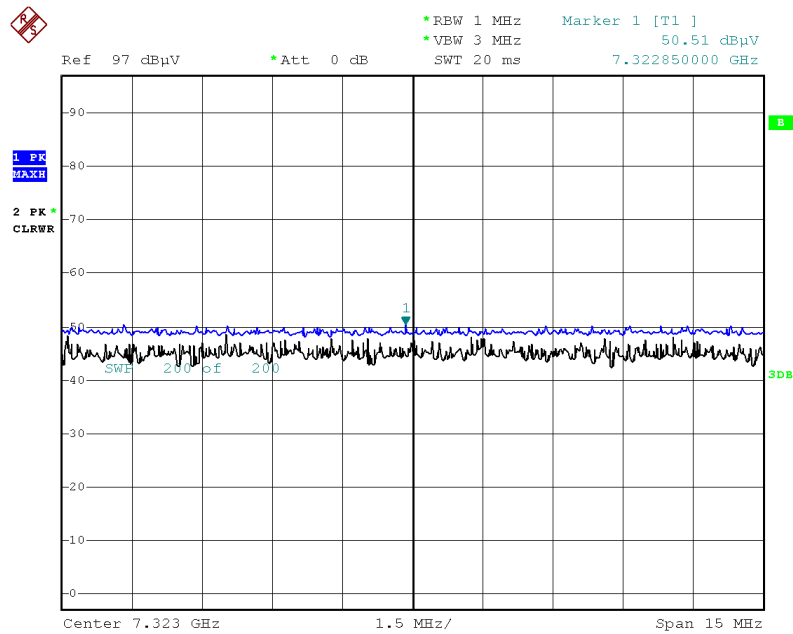
Date: 19.DEC.2019 18:04:45

ANT+ R.S.E 3rd Harmonic(Period 128(0dBm)/ch.39)

RSE

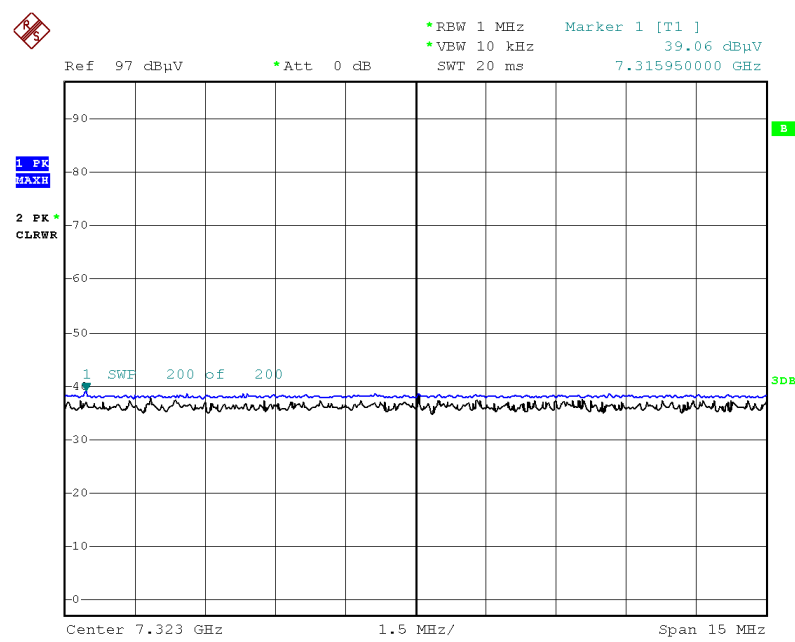
Frequency	Reading	A.F + C.L - A.G + D.F	Duty Cycle Correction	Pol.	Total	Limit	Margin	Measurement
[MHz]	[dBuV]	[dB]	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	Type
7323	50.51	9.96	V	60.47	73.98	13.51	PK	7323
7323	39.06	9.96	V	49.02	53.98	4.96	AV	7323

Radiated Spurious Emissions plot – Peak Reading



Date: 19.DEC.2019 18:18:10

Radiated Spurious Emissions plot – Average Reading

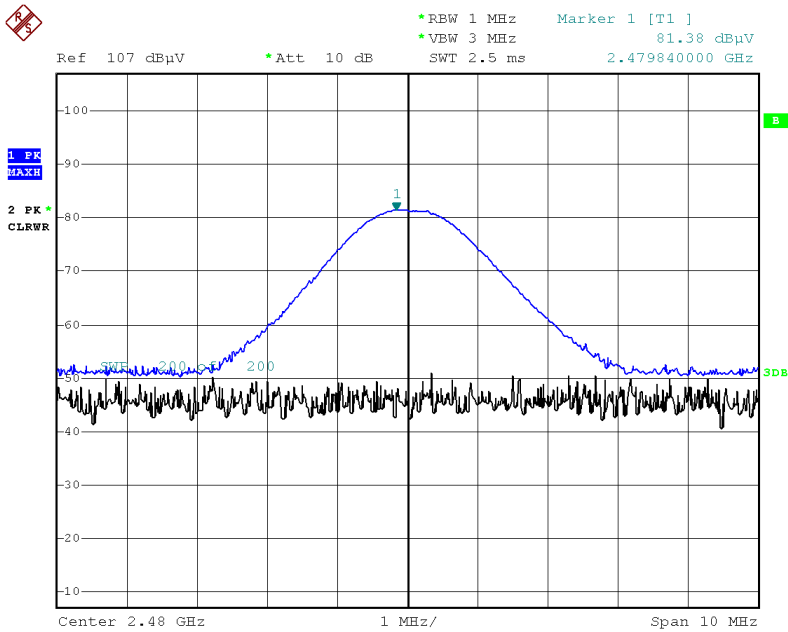


Date: 19.DEC.2019 18:18:56

ANT+ Field Strength (Period 128(0dBm)/ch.78)

Fundamental

Frequency	Reading	A.F+C.L -A.G+D.F +ATT	Ant. Pol.	D.C.C.F	Total	Limit	Margin	Measurement Type
[MHz]	[dBuV/m]	[dB]	[H/V]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
2480	81.38	1.15	H	0.00	82.53	113.98	31.45	PK
2480	81.38	1.15	H	-31.88	50.65	93.98	43.33	AV



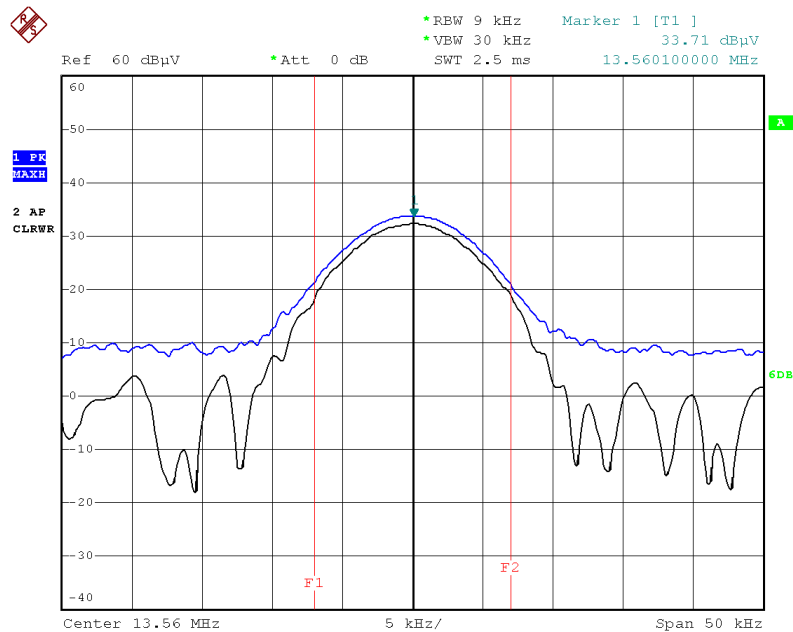
Date: 19.DEC.2019 17:31:58

NFC Field Strength (With Tag mode)

Fundamental

Frequency (MHz)	Read Level (dBuV/m)@3m	Ant.Factor +Cable Loss (dB/m)	Distance Correction (dB)	Total (dBuV/m)@30m	Limit (dBuV/m)@30m	Margin (dB)
13.5601	33.71	20.74	-40	14.45	84.00	69.55

Field Strength plot



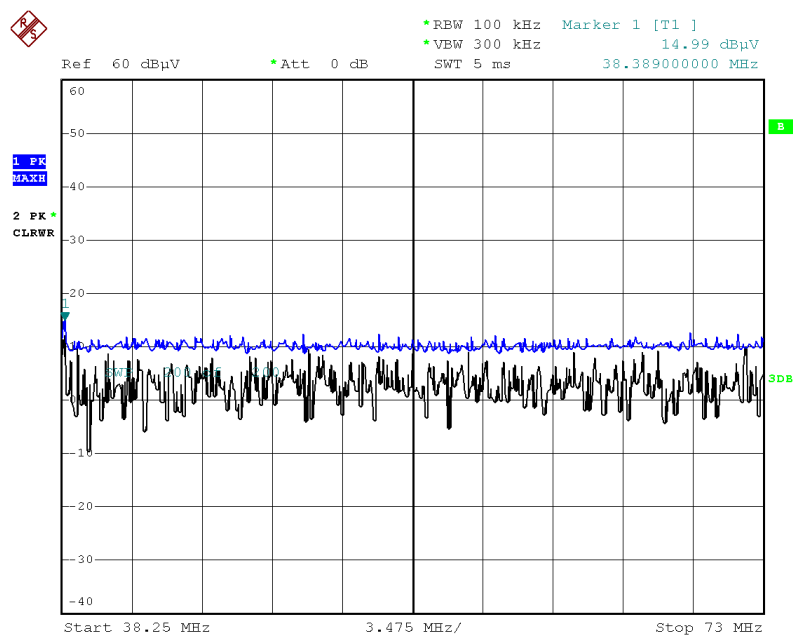
Date: 18.DEC.2019 16:24:25

NFC R.S.E (With Tag mode)

RSE

Frequency (MHz)	Read Level (dBuV/m)@3m	Ant.Factor (dB/m)	Cable Loss (dB)	Ant. Pol (H/V)	Total (dBuV/m)	Limit (dBuV/m)	Margin (dB)
38.389	14.99	12.38	0.78	H	28.15	40.0	11.85

Radiated Spurious Emissions plot



Date: 30.DEC.2019 09:47:21