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

Applicant Name:
SAMSUNG Electronics Co., Ltd.

Address:
129, Samsung-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Rep. of Korea

Date of Issue:
August 11, 2020
Location:
HCT CO., LTD.,
74, Seoicheon-ro 578beon-gil, Majang-myeon,
Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA

FCC ID:	**A3LSMA315G**
APPLICANT:	**SAMSUNG Electronics Co., Ltd.**

Equipment Class(es) :	PCE, DSS, DTS, NII
Rule Part(s) :	15, 22, 24, 27, 2
Application's Statement :	The applicant takes full responsibility that the test data referenced below represents compliance for this FCC ID.
Differences Brief Description :	Hardware and software of this device are identical to the implementation in A3LSMA315GL 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
Licensed EMC	ERP / EIRP	Share
	RSE	Share
Unlicensed EMC	Band Edge	Share
	Spurious Emissions	Share

Reference Detail Section

Reference FCC ID	Equipment Class	Report Title	Section
A3LSMA315GL	PCE	2G, 3G Report	All sections
		LTE B12(17) Report	All sections
		LTE B13 Report	All sections
		LTE B2 Report	All sections
		LTE B5 Report	All sections
		LTE B66(4) Report	All sections
		LTE B41 Report	All sections
	DSS	Bluetooth Report	All sections
	DTS	DTS Report	All sections
		BT LE Report	All sections
	NII	UNII Test Report	All sections

Report prepared by : Jae Ryang Do

Engineer of Telecommunication testing center

Approved by : Kwon Jeong

Manager of Telecommunication testing center

REVISION HISTORY

The revision history for this test report is shown in table.

Revision No.	Date of Issue	Description
0	August 07, 2020	Initial Release
1	August 11, 2020	Revised the Cover page. (include LTE B5 in the reference detail section).

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Appendix A. The Spot check test data

1. Summary of the spot check for Licensed EMC

1.1 EFFECTIVE RADIATED POWER

Mode	Ch./ Freq.		Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol.	Limit	ERP	
	channel	Freq.(MHz)						W	W	dBm
GSM850	128	824.2	-23.82	39.79	-10.25	1.28	V	< 7.00	0.670	28.26
WCDMA850	4132	826.4	-32.92	30.69	-10.25	1.28	V		0.082	19.16
LTE B5	20450	829.0	-33.26	30.55	-10.22	1.28	V		0.080	19.05

Mode	Ch./ Freq.		Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol.	Limit	ERP	
	channel	Freq.(MHz)						W	W	dBm
LTE B12(17)	23173	715.5	-31.76	28.74	-9.94	1.19	V	< 3.00	0.058	17.61
LTE B13	23230	782.0	-31.17	30.94	-10.09	1.24	H		0.091	19.61

Mode	Frequency (MHz)		Mode	SM_A315G/DSL (dBm)	SM_A315G/DS (dBm)	Deviation (dB)
	MHz	Ch.				
GSM850	824.2	128	VOICE	27.32	28.26	-0.94
WCDMA850	826.4	4132	RMC	18.74	19.16	-0.42
LTE B12(17) (B.W 1.4MHz)	715.3	23095	QPSK	18.04	17.61	0.43
LTE B13 (B.W 10MHz)	782.0	23230	QPSK	19.91	19.61	0.30
LTE B5 (B.W 10MHz)	829.0	20450	QPSK	18.67	19.05	-0.38

1.2 EQUIVALENT ISOTROPIC RADIATED POWER

Mode	Ch./ Freq.		Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol.	Limit	ERP	
	channel	Freq.(MHz)						W	W	dBm
GSM1900	810	1909.8	-14.32	20.02	10.23	2.00	V	< 2.00	0.668	28.25
WCDMA1900	9262	1852.4	-20.71	12.93	10.10	1.94	V		0.129	21.09
WCDMA1700	1412	1732.4	-17.26	16.12	9.90	1.89	H	< 1.00	0.259	24.13
LTE B2	18650	1855.0	-21.22	12.59	10.12	1.94	V	< 2.00	0.119	20.77
LTE B66(4)	132322	1745.0	-18.24	15.12	9.98	1.90	H	< 1.00	0.209	23.20
LTE B41	39750	2593.0	-23.29	13.50	10.98	2.35	H	< 2.00	0.163	22.13

Mode	Frequency		Mode	SM_A315G/DSL (dBm)	SM_A315G/DS (dBm)	Deviation (dB)
	MHz	Ch.				
GSM1900	1909.8	810	VOICE	26.84	28.25	-1.41
WCDMA1900	1852.4	9262	RMC	21.51	21.09	0.42
WCDMA1700	1732.4	1513	RMC	23.28	24.13	-0.85
LTE B2 (B.W 10MHz)	1855.0	18650	QPSK	20.98	20.77	0.21
LTE B66 (B.W 10MHz)	1745.0	132322	QPSK	22.66	23.20	-0.54
LTE B41 (B.W 5MHz)	2593.0	40620	QPSK	23.18	22.13	1.05

1.3 RADIATED SPURIOUS EMISSIONS

Mode, Channel, (Frequency)	Freq. (MHz)	Measured Level (dBm)	Ant. Gain (dBd)	Substitute Level (dBm]	C.L	Pol.	Result (dBm)
GSM850 CH 128 (824.2)	2,472.60	-55.39	10.60	-60.43	2.28	H	-52.11
WCDMA850 CH 4233 (846.6)	3,386.40	-58.16	12.63	-60.16	2.72	V	-50.25
LTE B13 (B.W 5MHz) CH 23230 (782.0)	3,128.0	-57.70	11.15	-58.87	2.59	V	-50.31
LTE B13 Wide Band (B.W 10MHz) CH 23230 (782.0)	1602.6	-63.08	9.35	-73.19	1.81	H	-65.65
LTE B5 CH 20407 (824.7)	3,298.80	-58.01	12.30	-59.95	2.69	V	-50.34
LTE B12(17) CH 23155 (713.5)	2,854.00	-57.98	11.02	-60.21	2.47	H	-51.66

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Modulation	Frequency		Mode	SM_A315G/DSL (dBm)	SM_A315G/DS (dBm)	Deviation (dB)
	MHz	Ch.				
GSM850	2472.60	128	VOICE	-45.00	-52.11	7.11
WCDMA850	3386.40	4233	RMC	-49.32	-50.25	0.93
LTE B12 (B.W 5MHz)	2854.00	23155	QPSK	-49.98	-51.66	1.68
LTE B13 (B.W 5MHz)	3128.00	23230	QPSK	-49.28	-50.31	1.03
LTE B13 Wide Band (B.W 10MHz)	1602.6	23230	QPSK	-65.54	-65.65	0.11
LTE B5 (B.W 1.4MHz)	3298.80	20407	QPSK	-49.71	-50.34	0.63

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Mode, Channel (Frequency)	Freq. (MHz)	Measured Level (dBm)	Ant. Gain (dBd)	Substitute Level (dBm]	C.L	Pol.	Result (dBm)
GSM1900 CH 661 (1880.0)	7,520.00	-56.04	11.30	-45.87	4.30	H	-38.87
WCDMA1900 CH 9538 (1907.6)	7,630.40	-57.90	11.60	-47.85	4.34	V	-40.59
WCDMA1700 CH 1513 (1752.6)	7,010.40	-55.79	11.65	-47.53	4.10	H	-39.98
LTE B2 CH 18700 (1860.0)	7,440.00	-55.72	11.18	-45.52	4.25	H	-38.59
LTE B66(4) CH 132322 (1745.0)	6,980.00	-56.37	11.85	-48.89	4.11	V	-41.15
LTE B41 CH 40620 (2593.0)	10,372.00	-59.41	10.75	-56.15	5.16	V	-50.56

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Modulation	Frequency		Mode	SM_A315G/DSL (dBm)	SM_A315G/DS (dBm)	Deviation (dB)
	MHz	Ch.				
GSM1900	7520.00	661	VOICE	-39.78	-38.87	-0.91
WCDMA1900	7630.40	9538	RMC	-40.51	-40.59	0.08
WCDMA1700	7010.40	1513	RMC	-40.78	-39.98	-0.80
LTE B2 (B.W 20MHz)	7440.00	18700	QPSK	-39.87	-38.59	-1.28
LTE B66 (B.W 1.4MHz)	6980.00	132322	QPSK	-39.63	-41.15	1.52
LTE B41 (B.W 20MHz)	10372.00	40620	QPSK	-38.57	-50.56	11.99

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2. Summary of the spot check for Unlicensed EMC

Mod	Test Item	Mod / Channel	Measured Frequency [MHz]	SM_A315G/DSL Result [dBuV/m]		SM_A315G/DS Result [dBuV/m]		Deviation (dB)	
				Peak	Average	Peak	Average	Peak	Average
BT	Band Edge	DH5 / ch 78	2483.5 MHz~2500 MHz	59.27	47.84	57.50	47.68	1.77	0.16
	RSE	DH5 / ch 78	4960 MHz	52.55	43.83	48.91	42.31	3.64	1.52
BT LE	Band Edge	2 M_37 byte / ch 0	2310 MHz~2390 MHz	54.66	48.13	55.09	49.10	-0.43	-0.97
	RSE	2 M_37 byte / ch 39	7440 MHz	55.98	48.74	51.23	43.54	4.75	5.20
DTS	Band Edge	802.11n / ch 1_ PLS 15	2310 MHz~2389 MHz	71.39	49.91	71.84	50.26	-0.45	-0.35
			# 2389 MHz~2390 MHz	64.69	50.56	63.45	50.38	1.24	0.18
	RSE	802.11b / ch 6_ PLS 18	4874 MHz	53.11	47.83	51.76	48.05	1.35	-0.22
UNII	Band Edge	802.11ac VHT20 / ch 100_ PLS 13	5350 ~ 5460 MHz	60.04	43.92	58.84	44.00	1.20	-0.08
			5460 ~ 5470 MHz	65.79	-	64.45	-	1.34	-
	RSE	802.11a / ch 120_ PLS 16	11200 MHz	58.33	43.83	59.65	44.76	-1.32	-0.93

[Note] : “#” integration method Used (ANSI C63.10 Section11.13.3)

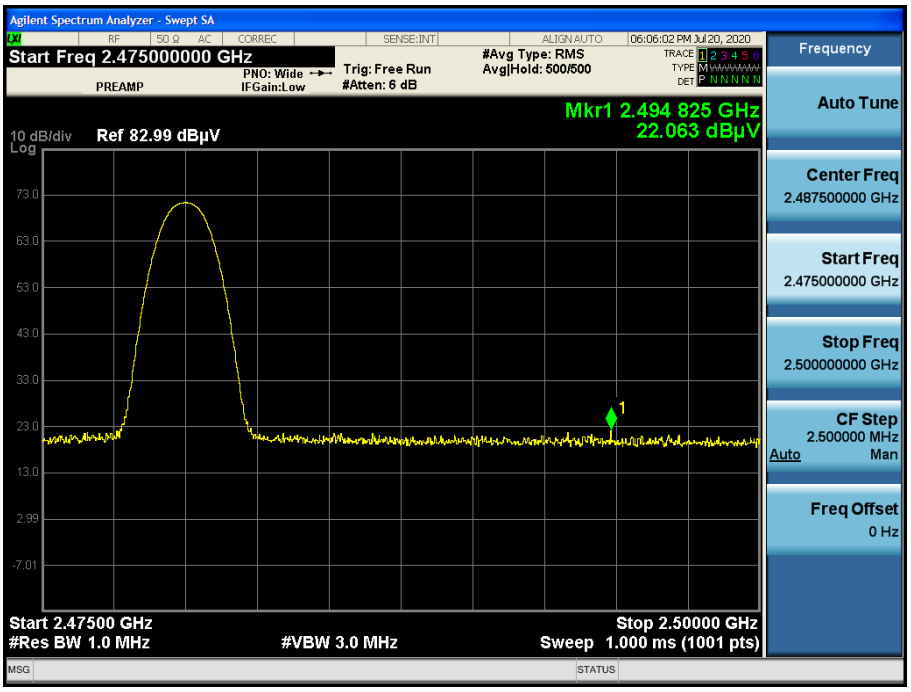
3. Test Plot

BT Band Edge (DH5/ch.78)

Bandedge

Frequency [MHz]	Reading [dBuV]	A.F.+CL [dB]	Pol. [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2483.5	22.063	34.25	H	56.31	73.98	17.67	PK
2483.5	13.426	34.25	H	47.68	53.98	6.30	AV
2483.5	23.251	34.25	V	57.50	73.98	16.48	PK
2483.5	13.103	34.25	V	47.35	53.98	6.63	AV

[Radiated Restricted Band Edges plot- Peak Reading]



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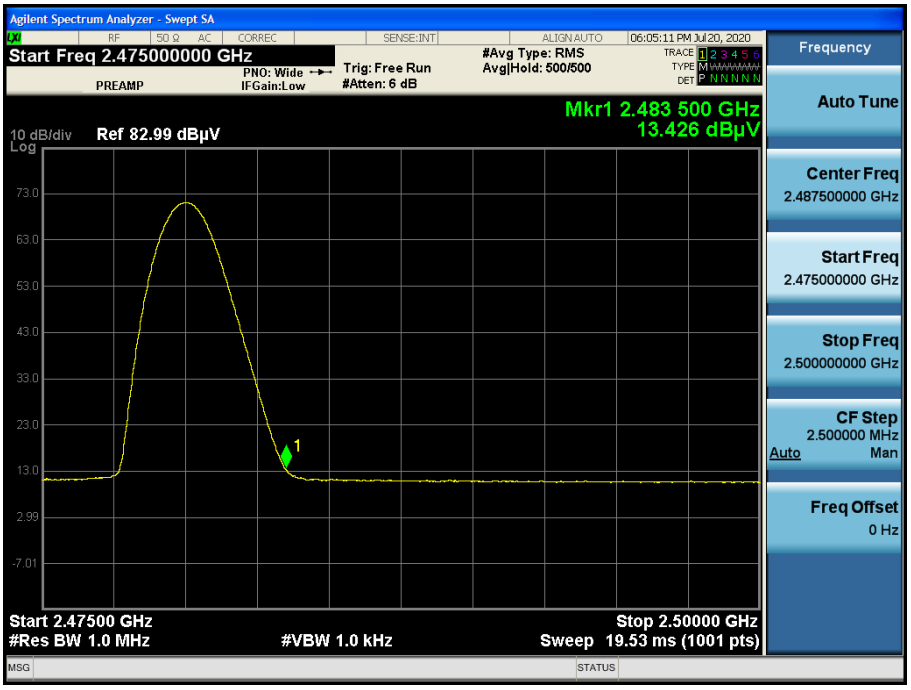
[Radiated Restricted Band Edges plot- Average Reading]



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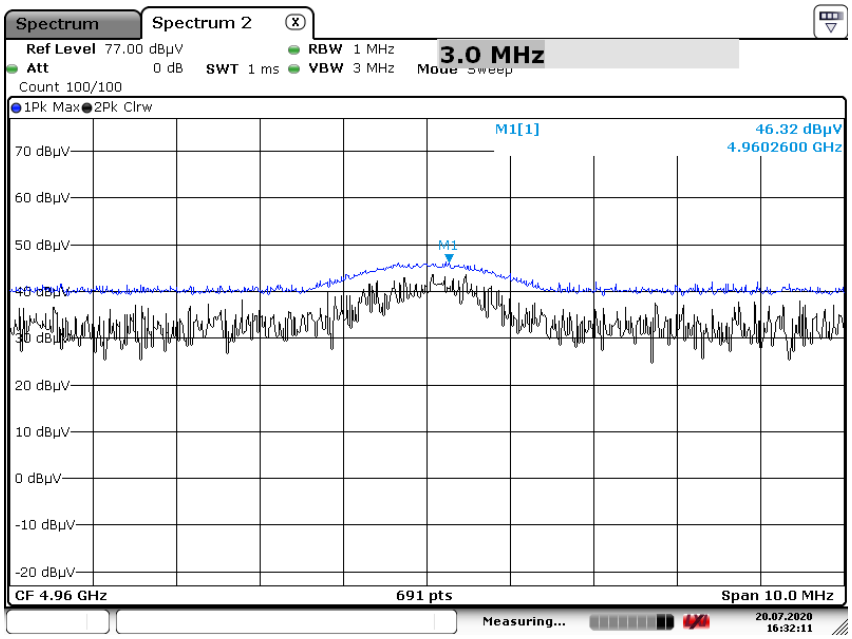
BT R.S.E 2nd Harmonic(DH5/ch.78)

RSE

Frequency [MHz]	Reading [dBuV]	AN.+CL-AMP G [dB]	Pol. [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4960	46.32	2.59	H	48.91	73.98	25.07	PK
4960	39.72	2.59	H	42.31	53.98	11.67	AV

[Radiated Spurious Emissions plot – Peak Reading]



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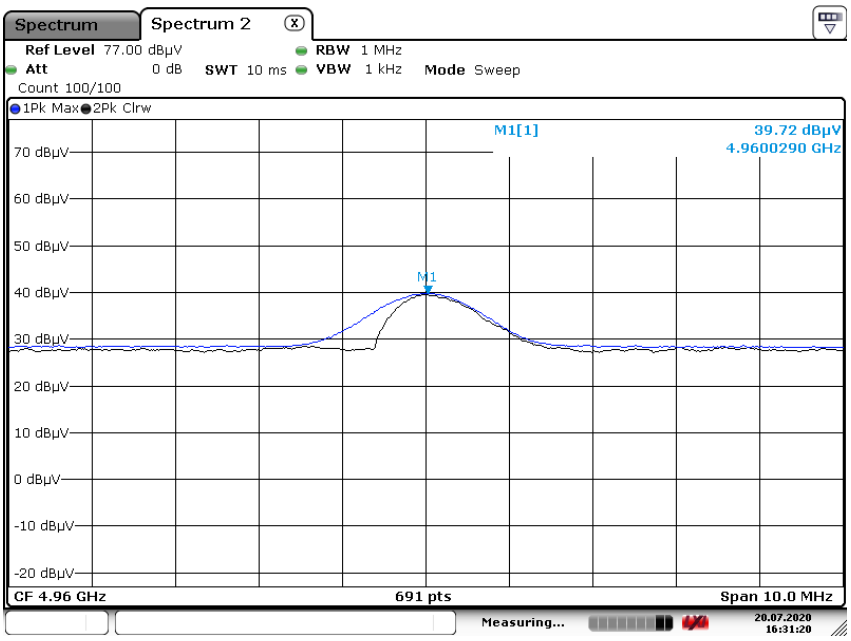

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DTS Band Edge (802.11n_ HT20 _MCS 0_ch1)

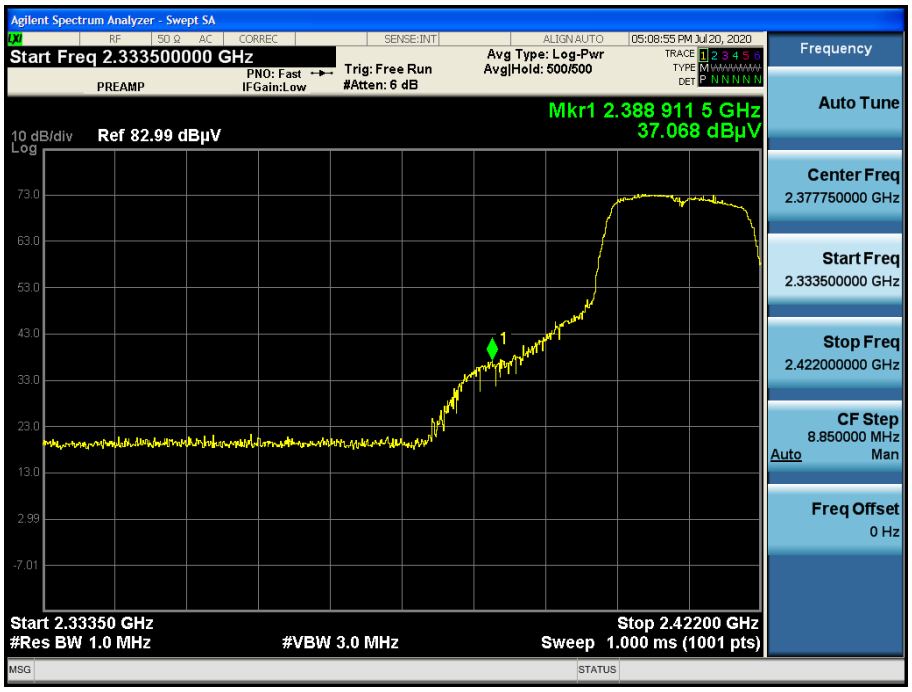
Bandedge

Frequency [MHz]	Reading [dBuV]	Duty Cycle Factor [dB]	A.F.+CL [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
* 2389 ~ 2390	28.680	0.000	34.77	H	63.45	73.98	10.53	PK
* 2389 ~ 2390	15.460	0.148	34.77	H	50.38	53.98	3.60	AV
2310 ~ 2389	37.068	0.000	34.77	H	71.84	73.98	2.14	PK
2310 ~ 2389	15.339	0.148	34.77	H	50.26	53.98	3.72	AV

Note : " * " integration method Used (ANSI C63.10 Section11.13.3)

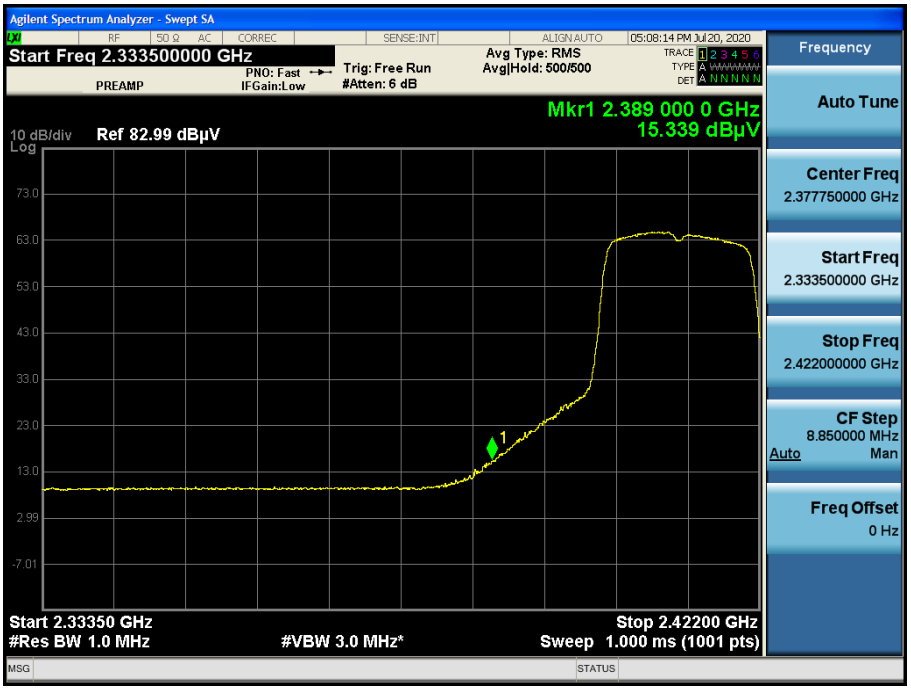
[Radiated Restricted Band Edges plot – Peak Reading]

2 310 ~ 2 389 MHz



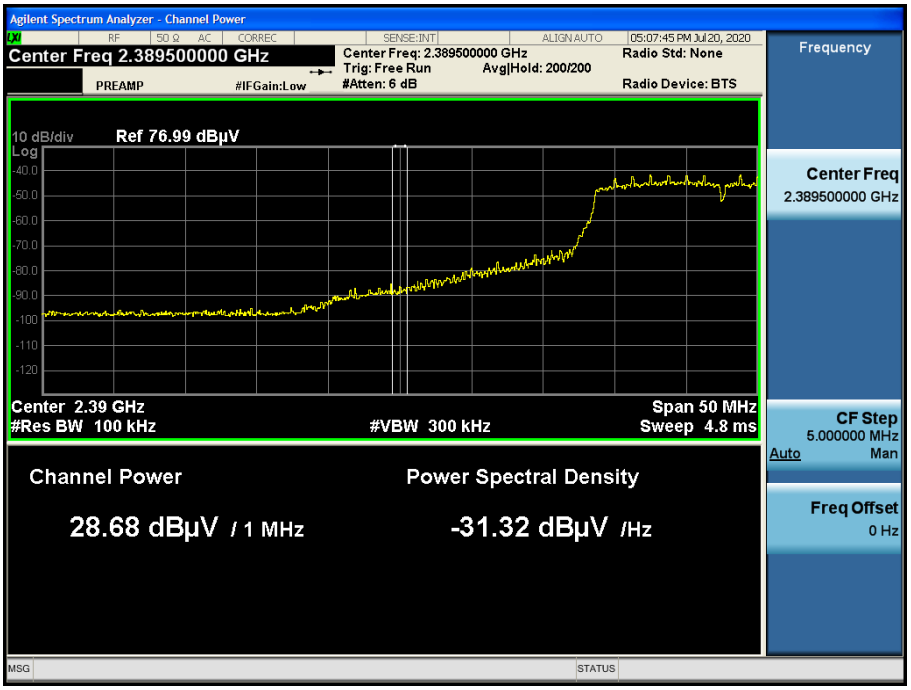
[Radiated Restricted Band Edges plot – Average Reading]

2 310 ~ 2 389 MHz



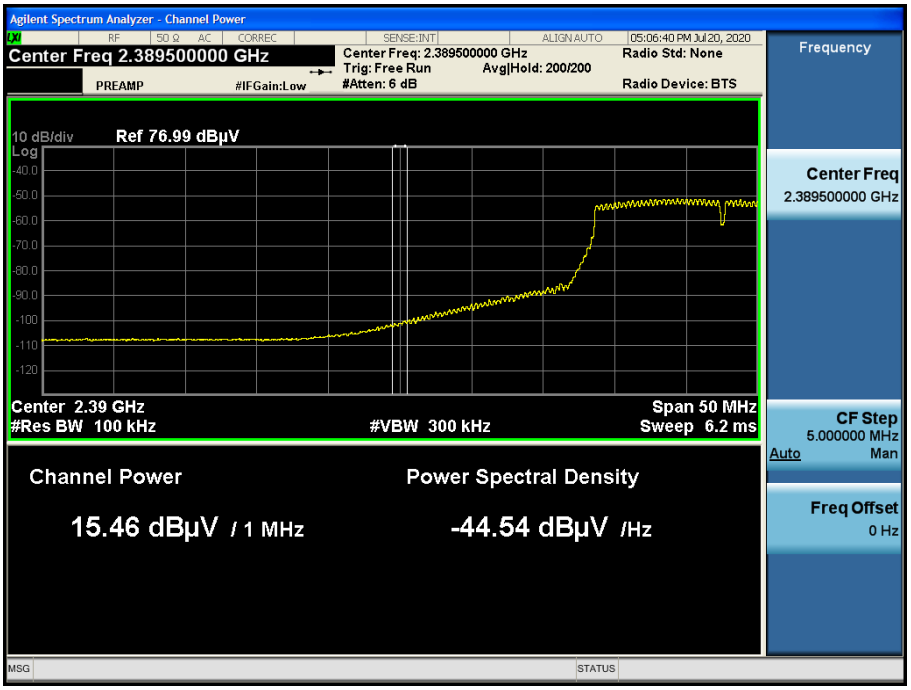
[Radiated Restricted Band Edges plot – Peak Reading]

2 389 ~ 2 390 MHz_ Integration Method



[Radiated Restricted Band Edges plot – Average Reading]

2 389 ~ 2 390 MHz_ Integration Method



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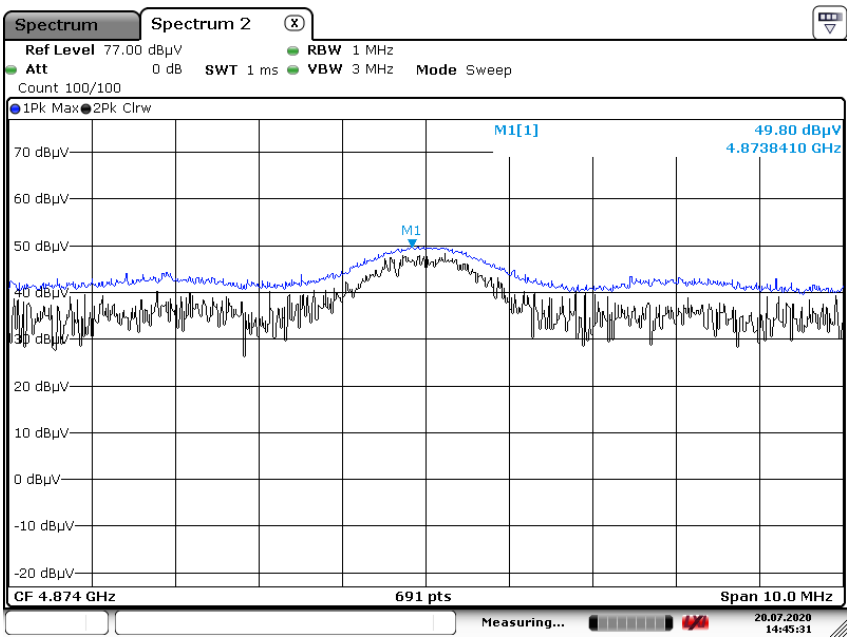
DTS R.S.E 2nd Harmonic (802.11b 1Mbps/ch.6)

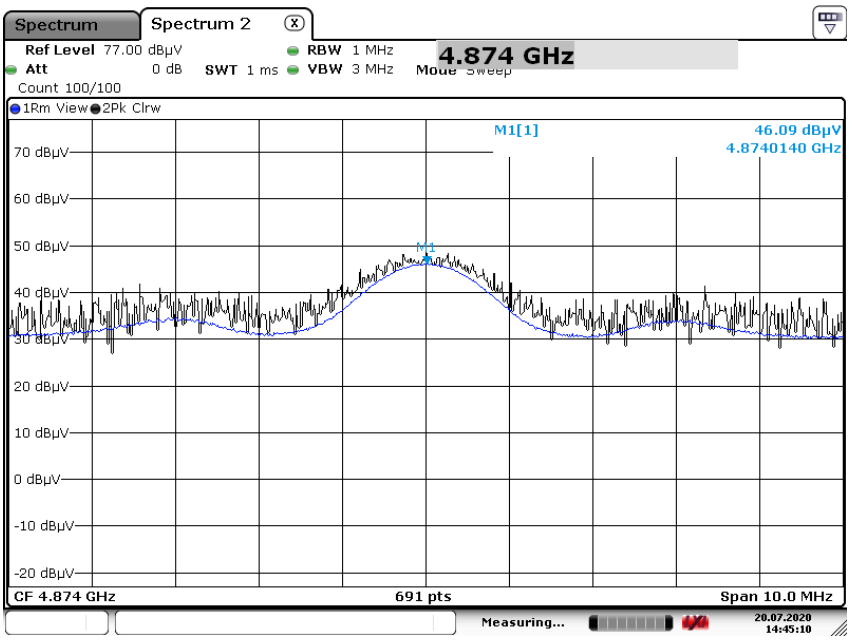
RSE

Frequency [MHz]	Reading [dBuV]	AN.+CL-AMP G [dB]	Pol. [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4874	49.80	1.96	H	51.76	73.98	22.22	PK
4874	46.09	1.96	H	48.05	53.98	5.93	AV

[Radiated Spurious Emissions plot – Peak Reading]



[Radiated Spurious Emissions plot – Average Reading]



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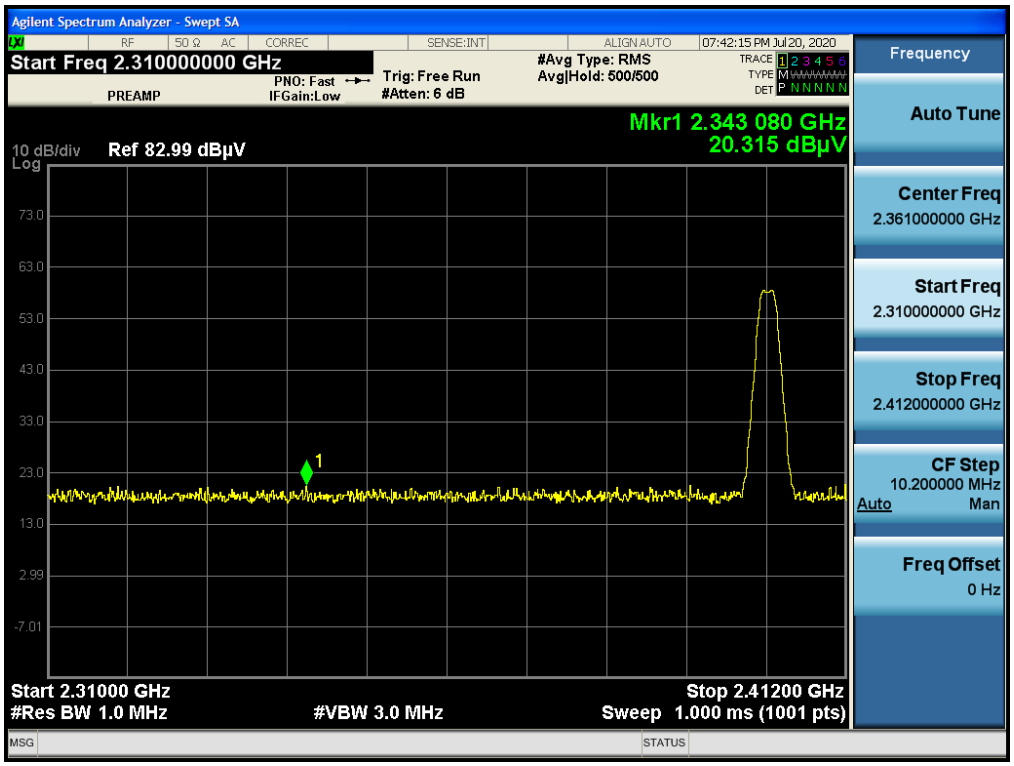
BT(LE) Band Edge (LE(5.0) 2M 37byte/ch.0)

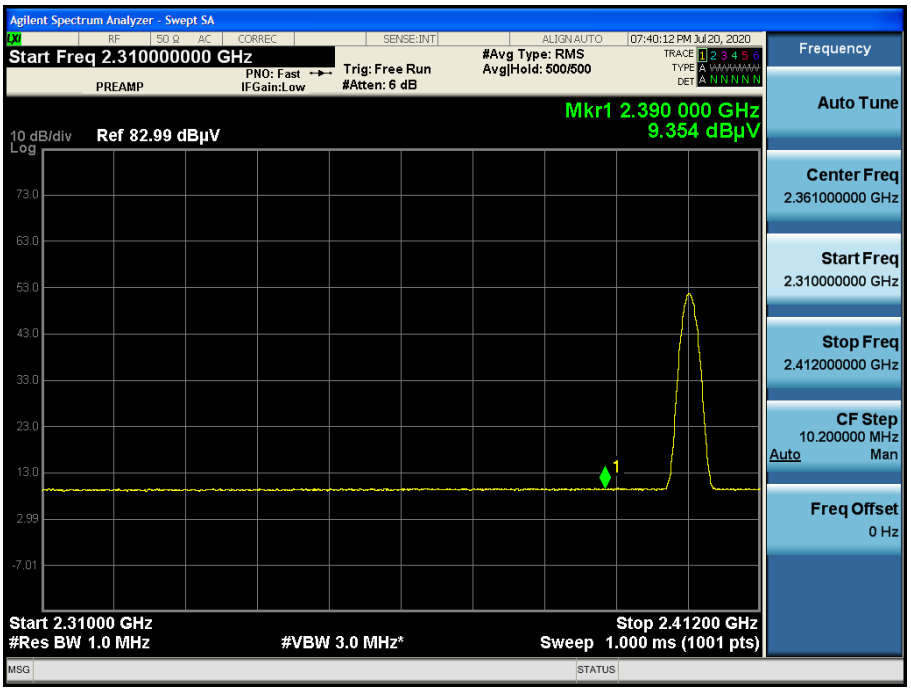
Bandedge

Frequency [MHz]	Reading [dBuV]	Duty cycle Factor [dB]	A.F.+CL [dB]	Pol. [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2390.0	20.315	0.00	34.77	H	55.09	73.98	18.90	PK
2390.0	9.354	4.98	34.77	H	49.10	53.98	4.88	AV

[Radiated Restricted Band Edges plot – Peak Reading]



[Radiated Restricted Band Edges plot – Average Reading]



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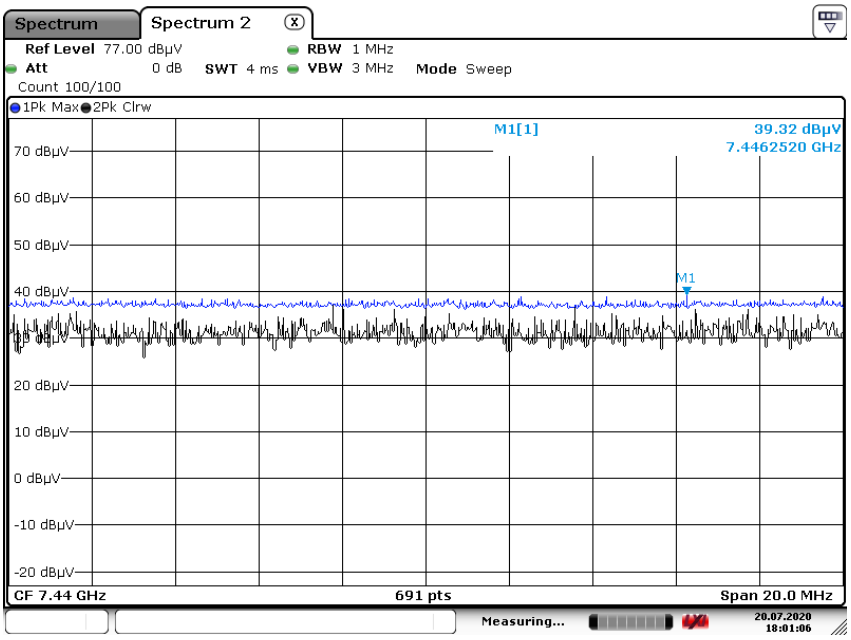
BT(LE) R.S.E 3rd Harmonic (LE(5.0) 2M 37byte/ch.39)

RSE

Frequency [MHz]	Reading [dBuV]	Duty cycle Factor [dB]	AN.+CL-AMP G [dB]	Pol. [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
7440	39.32	0.00	11.91	V	51.23	73.98	22.75	PK
7440	26.65	4.98	11.91	V	43.54	53.98	10.44	AV

[Radiated Spurious Emissions plot – Peak Reading]



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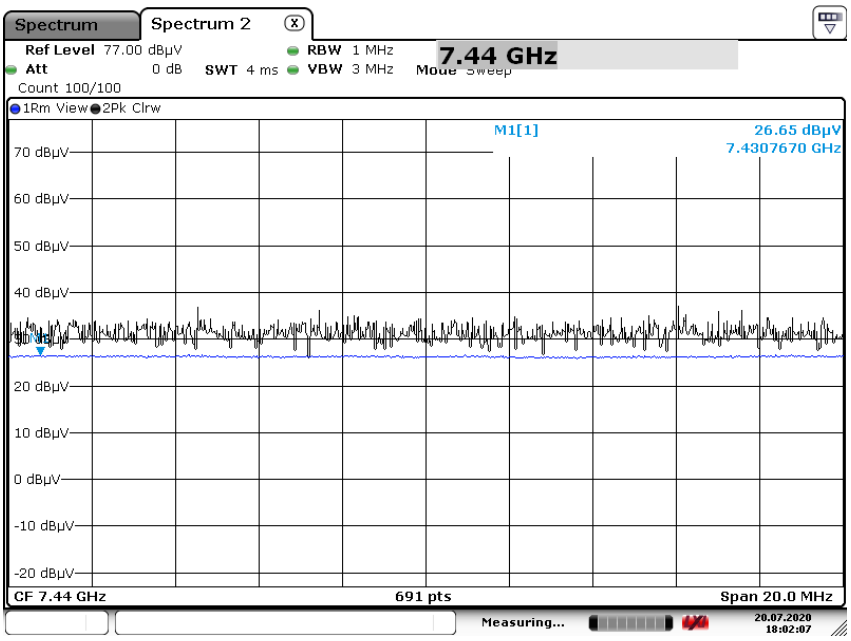

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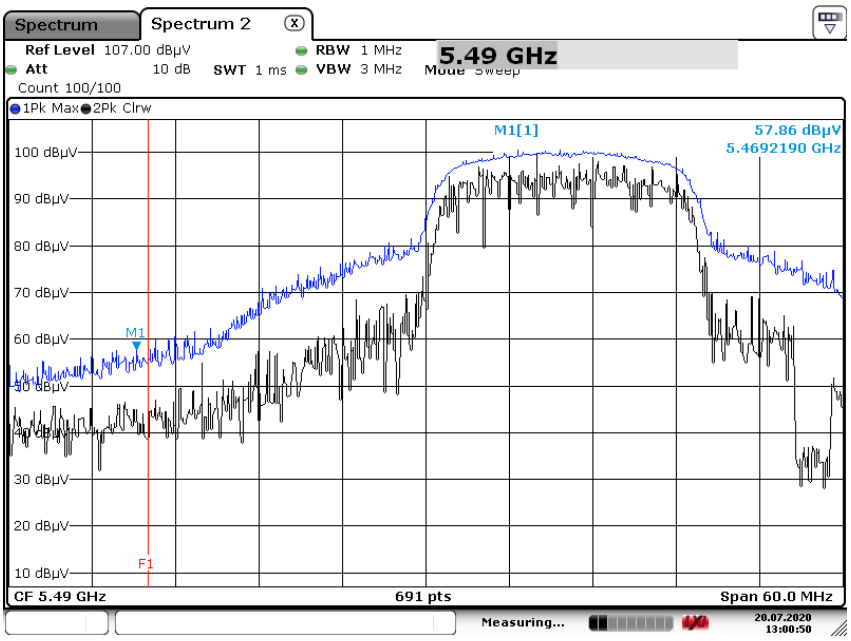
U-NII Band Edge (802.11ac_ VHT20_MCS 0 _ch100)

Bandedge

Frequency [MHz]	Reading [dBuV]	CL+AF+ATT-AG [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	51.79	7.05	H	58.84	73.98	15.14	PK
5460	36.95	7.05	H	44.00	53.98	9.98	AV
5470	57.86	6.59	H	64.45	68.20	3.75	PK
5460	48.91	7.05	V	55.96	73.98	18.02	PK
5460	36.20	7.05	V	43.25	53.98	10.73	AV
5470	56.28	6.59	V	62.87	68.20	5.33	PK

[Radiated Restricted Band Edges plot – Peak Reading]

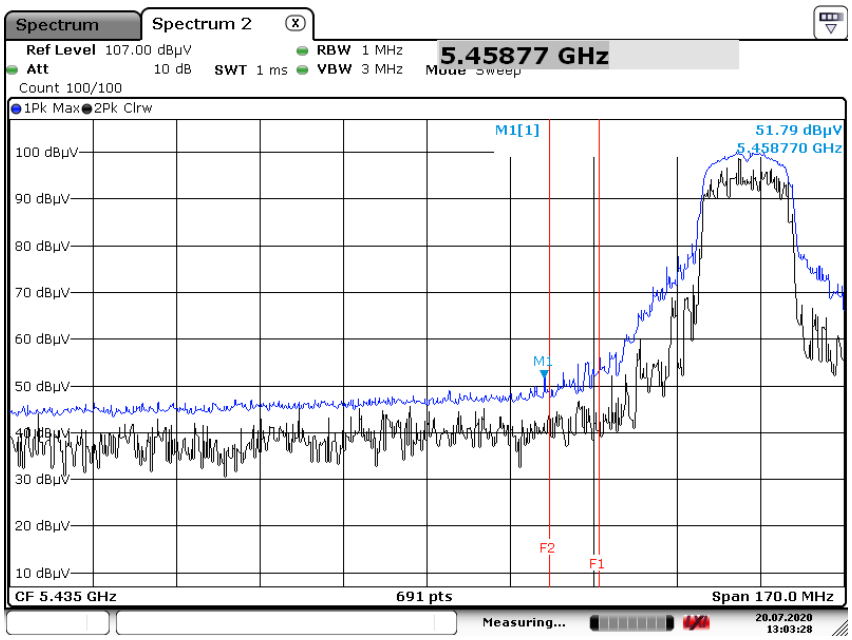
5460 ~ 5470 MHz



Date: 20.JUL.2020 13:00:50

[Radiated Restricted Band Edges plot – Peak Reading]

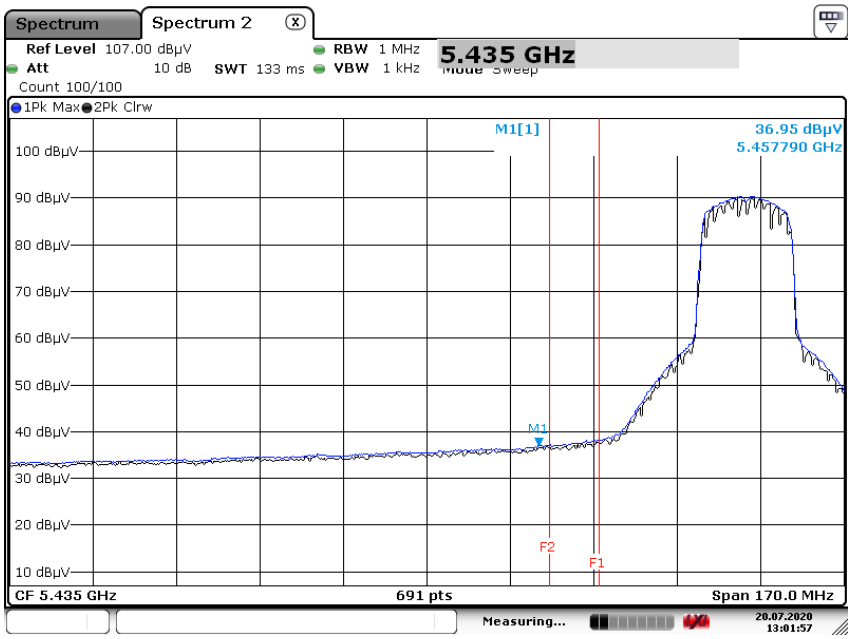
5350 ~ 5460 MHz



Date: 20.JUL.2020 13:03:28

[Radiated Restricted Band Edges plot – Average Reading]

5350 ~ 5460 MHz



Date: 20.JUL.2020 13:01:56

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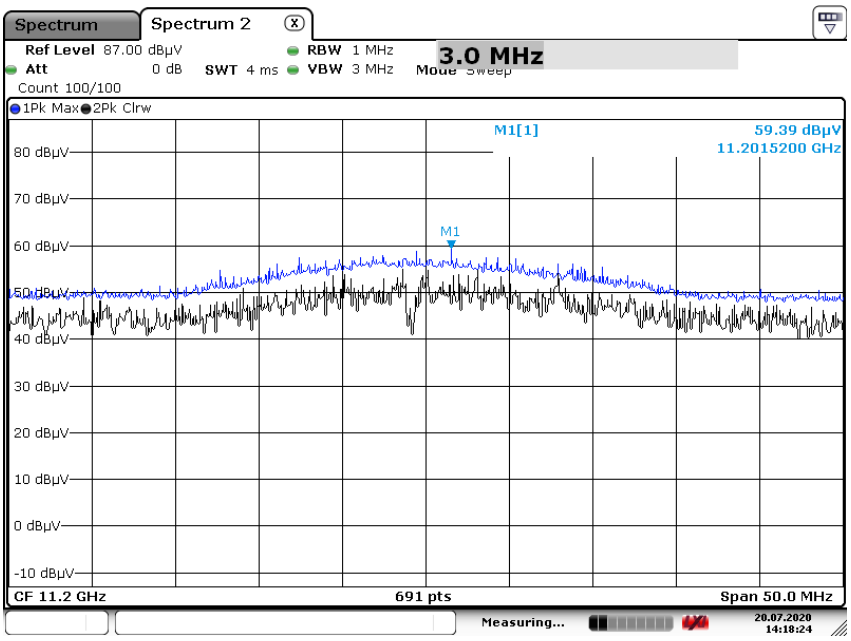
U-NII R.S.E 2nd Harmonic (802.11a_ Mbps 6 _ ch 120)

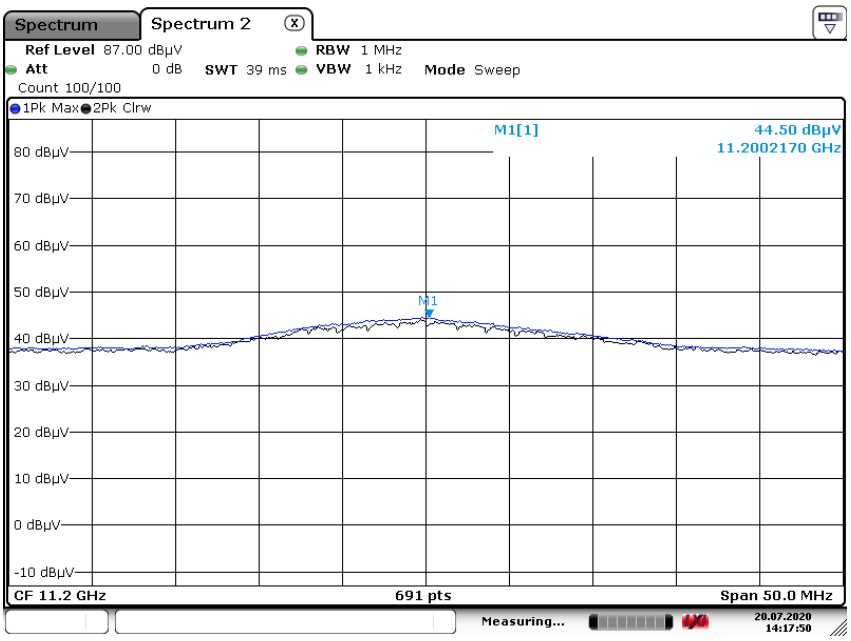
RSE

Frequency [MHz]	Reading [dBuV]	AN.+CL-AMP G [dB]	Pol. [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11200	59.39	0.26	H	59.65	73.98	14.33	PK
11200	44.50	0.26	H	44.76	53.98	9.22	AV

[Radiated Spurious Emissions plot – Peak Reading]



[Radiated Spurious Emissions plot – Average Reading]



Date: 20.JUL.2020 14:17:50

4. List of test equipment

Manufacture	Model/ Equipment	Serial Number	Calibration Date	Calibration Interval	Calibration Due
T&M SYSTEM	FBSR-02B(WHK1.2/15G-10EF)/H.P.F	-	03/09/2020	Annual	03/09/2021
T&M SYSTEM	FBSR-02B(WHK3.3/18G-10EF)/H.P.F	-	03/09/2020	Annual	03/09/2021
WAINWRIGHT INSTRUMENT	WHNX6.0/26.5G-6SS/H.P.F	1	03/19/2020	Annual	03/19/2021
Hewlett Packard	11667B / Power Splitter(DC~26.5 GHz)	11275	04/27/2020	Annual	04/27/2021
Agilent	E3632A/DC Power Supply	MY40010967	06/05/2020	Annual	06/05/2021
Schwarzbeck	UHAP/ Dipole Antenna	557	03/29/2019	Biennial	03/29/2021
Schwarzbeck	UHAP/ Dipole Antenna	558	03/29/2019	Biennial	03/29/2021
ESPEC	SU-642 / Chamber	93000717	08/14/2019	Annual	08/14/2020
Schwarzbeck	BBHA 9120D/ Horn Antenna(1~18GHz)	147	08/29/2019	Biennial	08/29/2021
Schwarzbeck	BBHA 9120D/ Horn Antenna(1~18GHz)	9120D-1298	09/25/2019	Biennial	09/25/2021
Schwarzbeck	BBHA 9170/ Horn Antenna(15~40GHz)	BBHA9170342	04/29/2019	Biennial	04/29/2021
Schwarzbeck	BBHA 9170/ Horn Antenna(15~40GHz)	BBHA9170124	01/28/2019	Biennial	01/28/2021
Agilent	N9020A/Signal Analyzer(10Hz~26.5GHz)	MY51110063	04/27/2020	Annual	04/27/2021
Hewlett Packard	8493C/ATTENUATOR(20dB)	17280	06/04/2020	Annual	06/04/2021
REOHDE & SCHWARZ	FSV40/Spectrum Analyzer(10Hz~40GHz)	100931	10/14/2019	Annual	10/14/2020
Agilent	8960 (E5515C)/ Base Station	MY48360800	08/27/2019	Annual	08/27/2020
Schwarzbeck	FMZB1513/ Loop Antenna(9kHz~30MHz)	1513-175	08/23/2018	Biennial	08/23/2020
Schwarzbeck	VULB9160/ Bilog Antenna	9160-3368	08/09/2018	Biennial	08/09/2020
Schwarzbeck	VULB9160/ Hybrid Antenna	760	03/22/2019	Biennial	03/22/2021
Anritsu Corp.	MT8821C/Wideband Radio Communication Tester	6262116770	07/22/2020	Annual	07/22/2021
Anritsu Corp.	MT8820C/Wideband Radio Communication Tester	6201026545	01/30/2019	Annual	01/22/2021
REOHDE & SCHWARZ	SMB100A/ SIGNAL GENERATOR (100kHz~40GHz)	177633	07/13/2020	Annual	07/13/2021
REOHDE & SCHWARZ	ESU40 / EMI TEST RECEIVER	100524	05/12/2020	Annual	05/12/2021
HCT CO., LTD.,	FCC LTE Mobile Conducted RF Automation Test Software	-	-	-	-

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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	05/18/2020	Biennial	1513-175
Schwarzbeck	VULB 9168 / Hybrid Antenna	03/22/2019	Biennial	760
Schwarzbeck	VULB 9160 / TRILOG Antenna	08/09/2018	Biennial	9160-3368
Schwarzbeck	BBHA 9120D / Horn Antenna	04/29/2019	Biennial	9120D-937
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	11/29/2019	Biennial	BBHA9170541
Rohde & Schwarz	FSP(9 kHz ~ 30 GHz) / Spectrum Analyzer	04/27/2020	Annual	100854
Rohde & Schwarz	FSV40-N / Spectrum Analyzer	09/26/2019	Annual	101068-SZ
Agilent	N9020A / Signal Analyzer	05/11/2020	Annual	MY51110085
Wainwright Instruments	WRCJV2400/2483.5-2370/2520-60/12SS / Band Reject Filter	01/21/2020	Annual	2
Wainwright Instruments	WRCJV5100/5850-40/50-8EEK / Band Reject Filter	02/10/2020	Annual	1
Wainwright Instruments	WHK3.0/18G-10EF / High Pass Filter	03/02/2020	Annual	8
Wainwright Instruments	WHKX8-6090-7000-18000-40SS/ High Pass Filter	03/02/2020	Annual	25
Api tech.	18B-03 / Attenuator (3 dB)	03/02/2020	Annual	1
Agilent	8493C-10 / Attenuator(10 dB)	03/02/2020	Annual	08285
CERNEX	CBLU1183540 / Power Amplifier	03/02/2020	Annual	22964
CERNEX	CBL06185030 / Power Amplifier	03/02/2020	Annual	22965
CERNEX	CBL18265035 / Power Amplifier	12/26/2019	Annual	22966
CERNEX	CBL26405040 / Power Amplifier	03/23/2020	Annual	25956