

TEST REPORT

EVALUATION Test for SM-R820

APPLICANT
SAMSUNG Electronics Co., Ltd.

DATE OF ISSUE
July 26, 2019

HCT Co., Ltd.

74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 KOREA
Tel. +82 31 634 6300 F ax. +82 31 645 6401



HCT Co., Ltd.

74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 KOREA
Tel. +82 31 634 6300 Fax. +82 31 645 6401



DATE OF ISSUE
July 26, 2019

FCC ID/IC
A3LSMR820/649E-SMR820

Applicant **SAMSUNG Electronics Co., Ltd.**
129, Samsung-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Rep. of Korea

Equipment Class(es) Rule Part(s)	DSS, DTS 15
Application's Statement	The applicant takes full responsibility that the test data referenced below represents compliance for this FCC ID.
Differences Brief Description	Bluetooth & WLAN hardware and software of this device are identical to the implementation in A3LSMR825. 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 result shown in this test report refer only to the sample(s) tested unless otherwise stated.

Tested by
Jung Ki Lim

Technical Manager
Jong Seok Lee

HCT CO., LTD.
Soo Chan Lee
SooChan Lee / CEO



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 FCC ID	Equipment Class	Report Title	Section
A3LSMR825	DSS	Bluetooth Report	All sections
	DTS	WLAN DTS Report	All sections
		BT LE Report	All sections

Appendix A. The Spot check test data

1. Summary of the spot check for Unlicensed EMC

-Aluminum-

	Test Item	Mod/Channel	Measured Frequency	SM-R825U Result [dBuV/m]		SM-R820 Result [dBuV/m]		Deviation (dB)	
				Peak	Average	Peak	Average	Peak	Average
BT	Band Edge	DH5 / ch 78	2483.5 MHz~2500 MHz	45.53	58.64	44.39	59.03	1.14	-0.39
	RSE	DH 5 /ch 78	7440 MHz	43.83	57.25	43.32	56.92	0.51	0.33
DTS	Band Edge	802.11n 6Mbps/ch.13	2483.5~ 2500 MHz	47.14	63.28	44.53	61.07	2.61	2.21
	RSE	802.11g 1Mbps/ch.6	7311 MHz	45.58	57.33	45.73	57.17	-0.15	0.16
BT(LE)	Band Edge	LE(5.0) 1M 37byte/ch.39	2483.5 MHz~2500 MHz	44.12	53.77	44.08	53.86	0.04	-0.09
	RSE	LE(5.0) 1M 37byte/ch.19	7320 MHz	47.33	57.05	47.12	57.17	0.21	-0.12

-Stainless-

	Test Item	Mod/Channel	Measured Frequency	SM-R825U Result [dBuV/m]		SM-R820 Result [dBuV/m]		Deviation (dB)	
				Peak	Average	Peak	Average	Peak	Average
BT	Band Edge	DH5 / ch 78	2483.5 MHz~2500 MHz	45.53	58.64	44.51	58.17	1.02	0.47
	RSE	DH 5 /ch 78	7440 MHz	43.83	57.25	43.39	57.17	0.44	0.08
DTS	Band Edge	802.11n 6Mbps/ch.13	2483.5~ 2500 MHz	47.14	63.28	44.54	61.39	2.60	1.89
	RSE	802.11g 1Mbps/ch.6	7311 MHz	45.58	57.33	45.78	57.58	-0.20	-0.25
BT(LE)	Band Edge	LE(5.0) 1M 37byte/ch.39	2483.5 MHz~2500 MHz	44.12	53.77	44.16	54.00	-0.04	-0.23
	RSE	LE(5.0) 1M 37byte/ch.19	7320 MHz	47.33	57.05	47.33	57.45	0.00	-0.40

2. List of test equipment for 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	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)	12/04/2017	Biennial	BBHA9170541
Rohde & Schwarz	FSP(9 kHz ~ 30 GHz) / Spectrum Analyzer	09/03/2018	Annual	100688
Rohde & Schwarz	FSV40-N / Spectrum Analyzer	09/28/2018	Annual	101068-SZ
Agilent	N9020A / Signal Analyzer	05/23/2019	Annual	MY51110085
Wainwright Instruments	WHK3.0/18G-10EF / High Pass Filter	05/23/2019	Annual	8
Wainwright Instruments	WHKX7.0/18G-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	01/03/2019	Annual	2
Api tech.	18B-03 / Attenuator (3 dB)	06/04/2019	Annual	1
Agilent	8493C-10 / Attenuator(10 dB)	07/15/2019	Annual	08285
CERNEX	CBLU1183540 / Power Amplifier	07/01/2019	Annual	22964
CERNEX	CBL06185030 / Power Amplifier	07/01/2019	Annual	22965
CERNEX	CBL18265035 / Power Amplifier	01/03/2019	Annual	22966
CERNEX	CBL26405040 / Power Amplifier	06/18/2019	Annual	25956

3. Test Plot

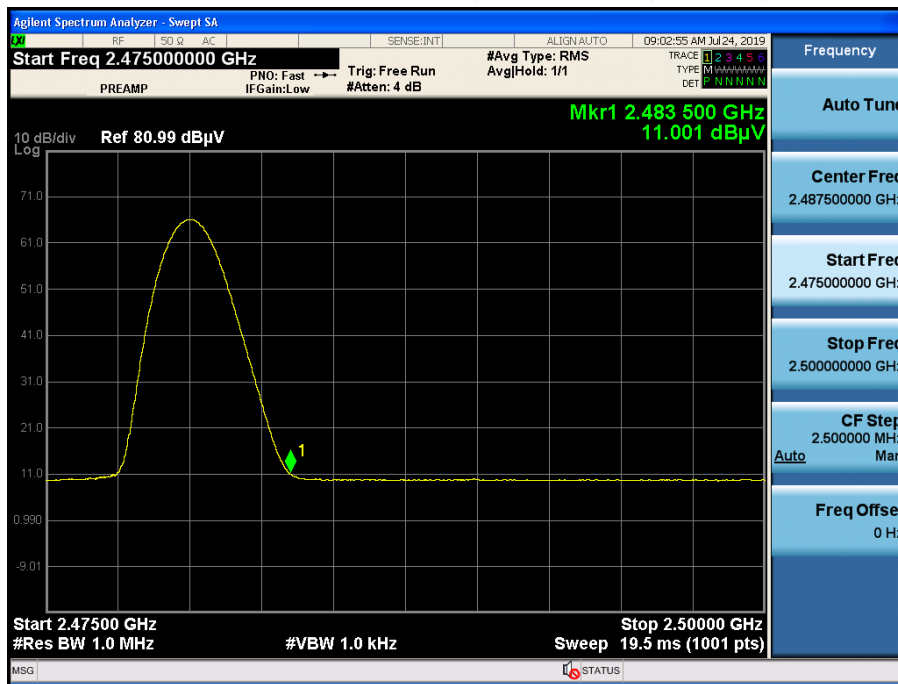
-Aluminum-

BT Band Edge (DH5/ch.78)

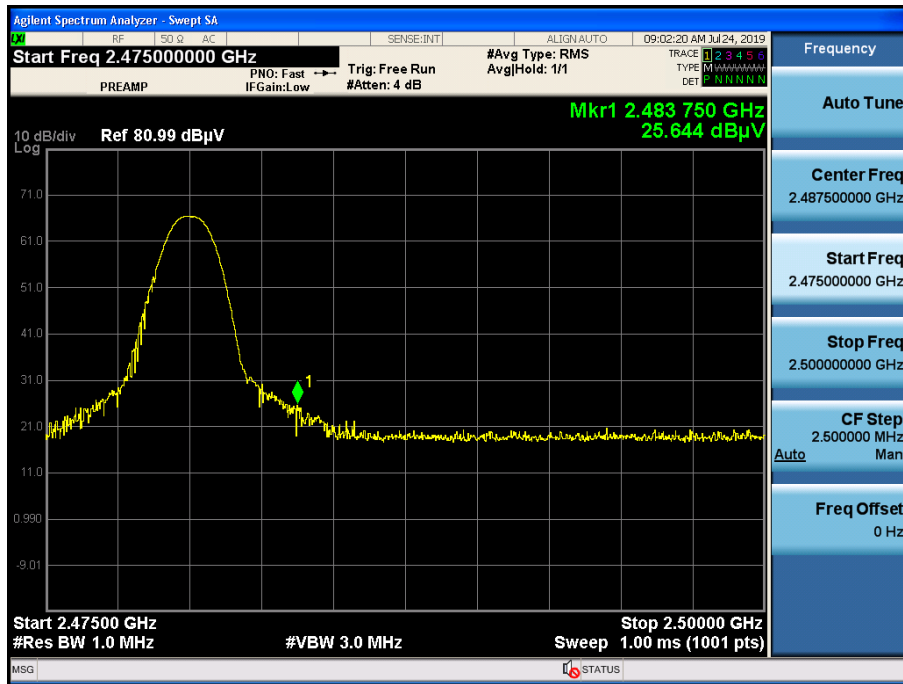
Bandedge

Frequency [MHz]	Reading dBuV	※ A.F.+CL [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
2483.5	25.644	33.39	V	59.03	73.98	14.95	PK
2483.5	11.001	33.39	V	44.39	53.98	9.59	AV

Radiated Restricted Band Edges plot – Average Reading



Radiated Restricted Band Edges plot – Peak Reading

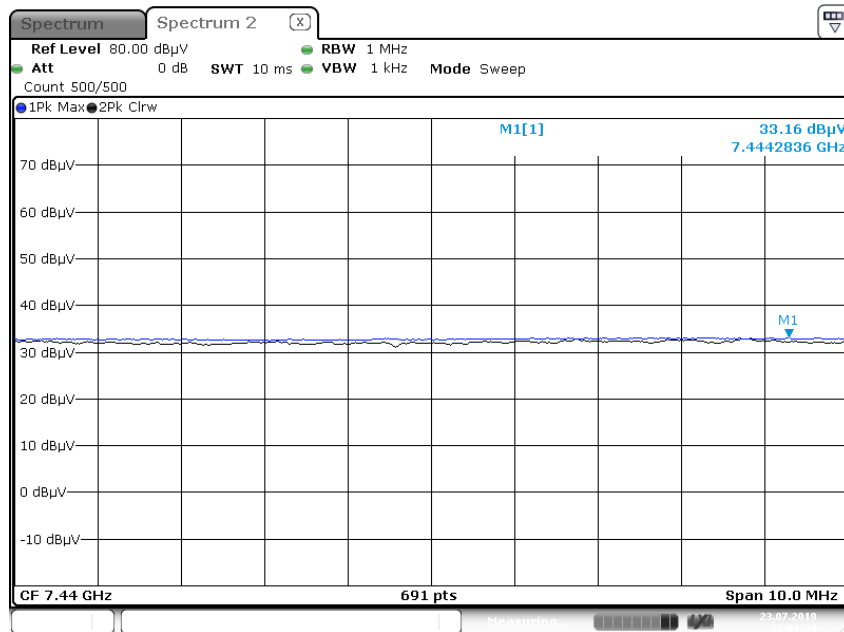


BT R.S.E 3rd Harmonic(DH5/ch.78)

RSE

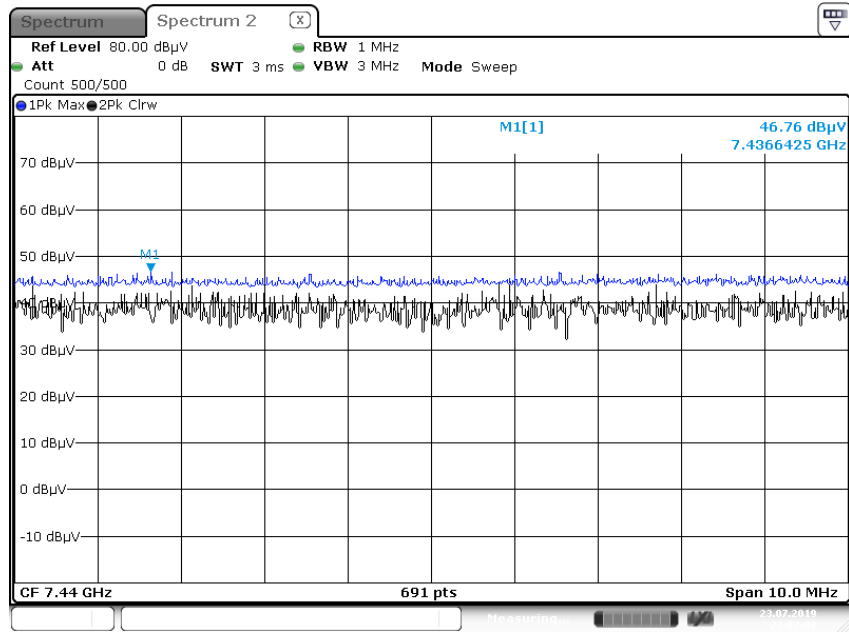
Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
7440	46.76	10.16	H	56.92	73.98	17.06	PK
7440	33.16	10.16	H	43.32	53.98	10.66	AV

Radiated Spurious Emissions plot – Average Reading



Date: 23.JUL.2019 22:01:34

Radiated Spurious Emissions plot – Peak Reading



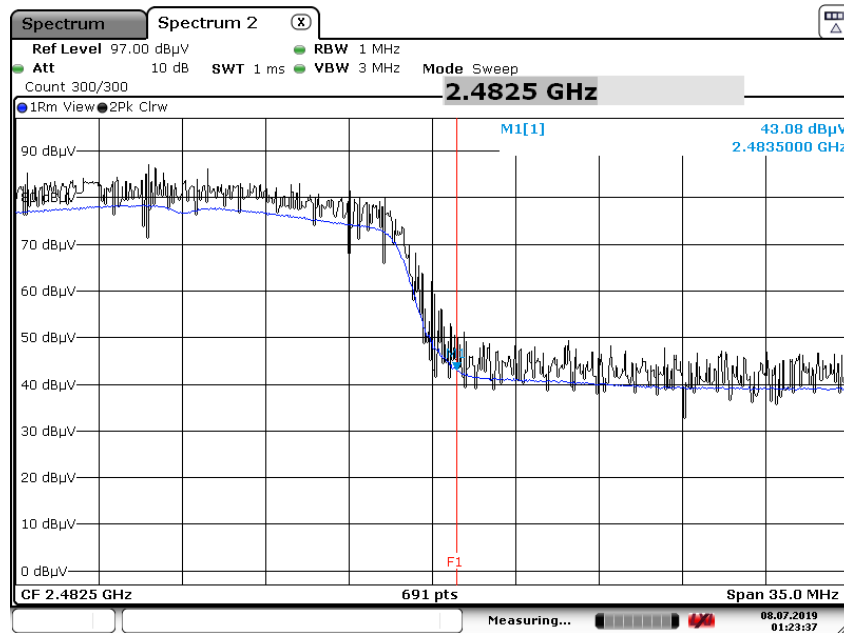
Date: 23.JUL.2019 22:02:09

DTS Band Edge (802.11n_6Mbps/ch.13)

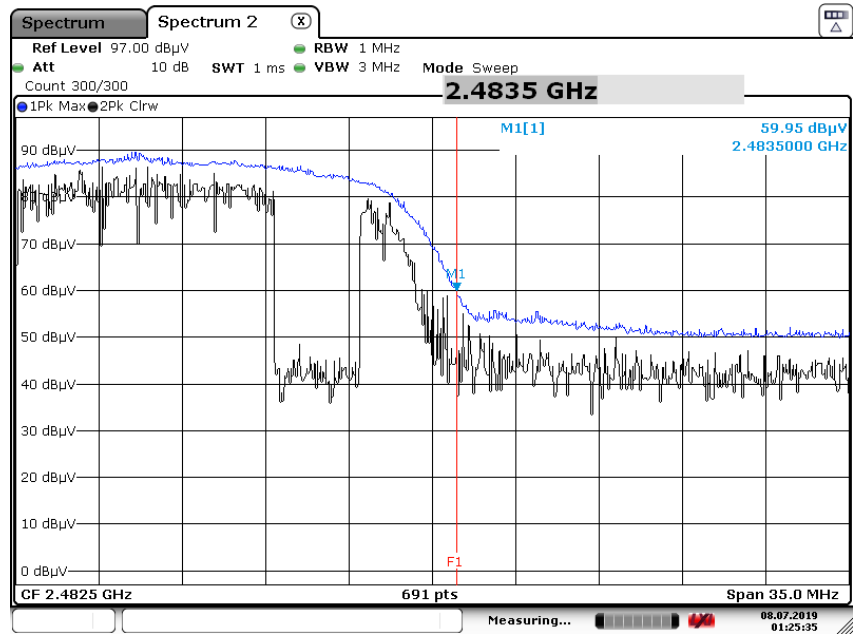
Bandedge

Frequency [MHz]	Reading dBuV	Duty Cycle Factor	※ A.F.+CL [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
2483.5	59.95	0.00	1.12	V	61.07	73.98	12.92	PK
2483.5	43.08	0.33	1.12	V	44.53	53.98	9.45	AV

Radiated Restricted Band Edges plot – Average Reading



Radiated Restricted Band Edges plot – Peak Reading



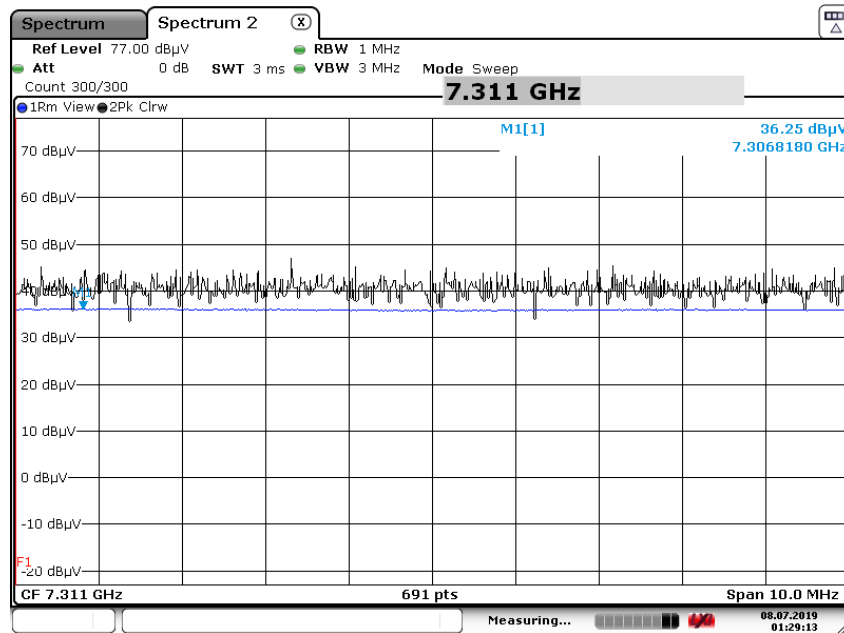
Date: 8.JUL.2019 01:25:35

DTS R.S.E 3rd Harmonic (802.11g 6Mbps/ch.6)

RSE

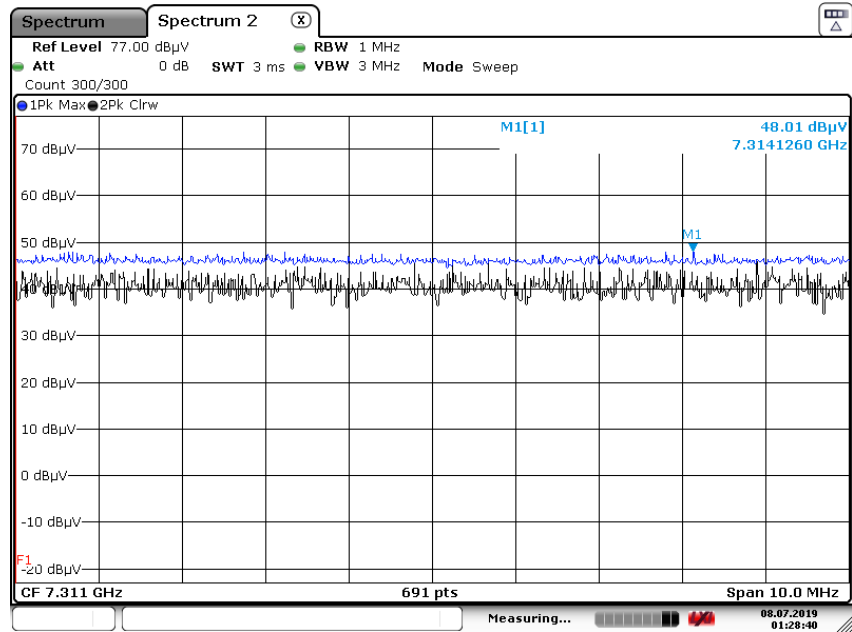
Frequency [MHz]	Reading dBuV	Duty Cycle Factor	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
7311	48.01	0.00	9.16	H	57.17	73.98	16.81	PK
7311	36.25	0.32	9.16	H	45.73	53.98	8.25	AV

Radiated Spurious Emissions plot – Average Reading



Date: 8.JUL.2019 01:29:13

Radiated Spurious Emissions plot – Peak Reading



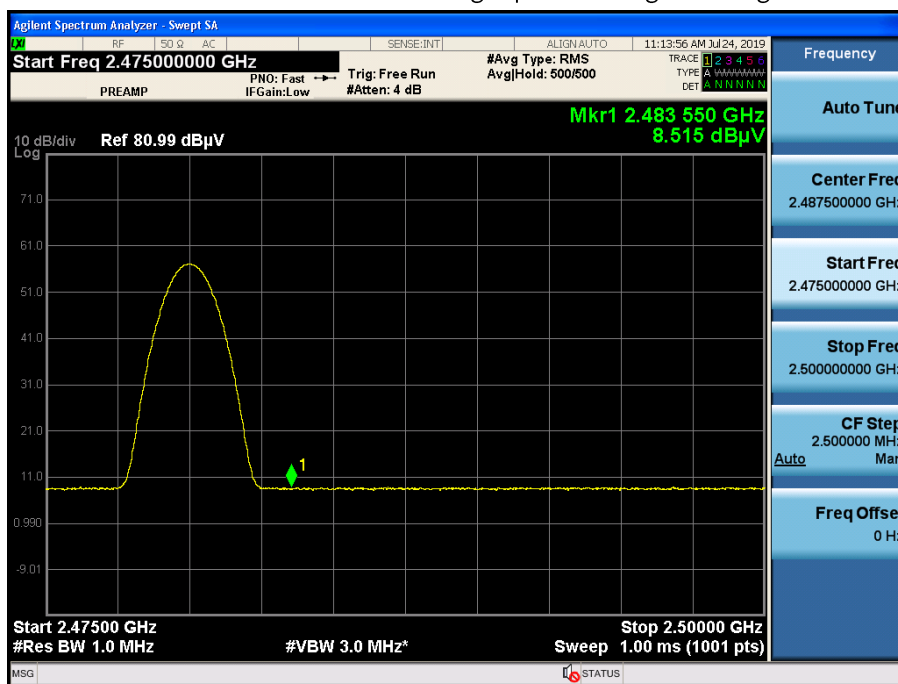
Date: 8.JUL.2019 01:28:41

BT(LE) Band Edge (LE(5.0) 1M 37byte/ch.39)

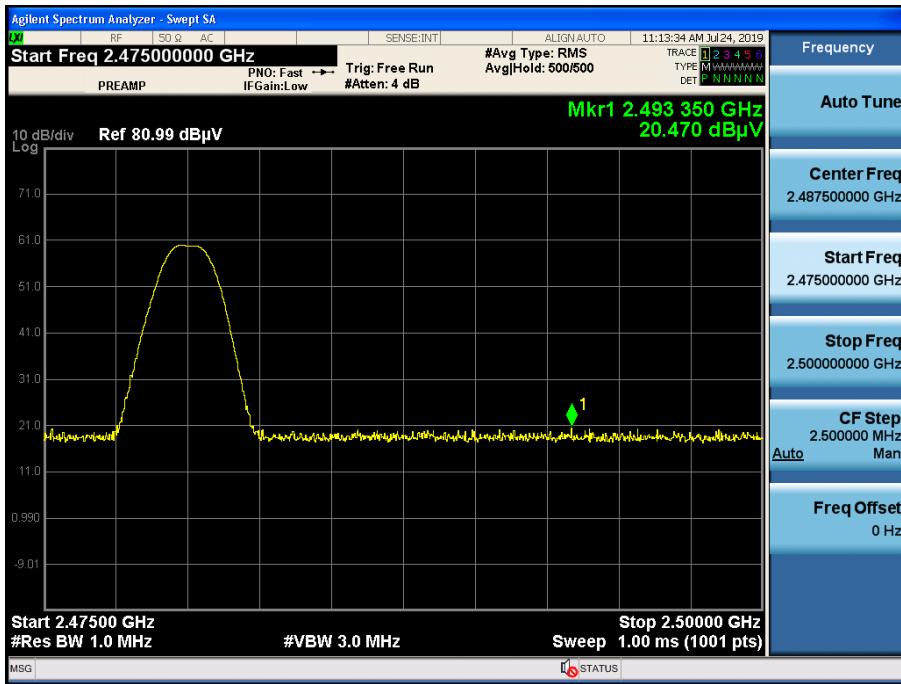
Bandedge

Frequency [MHz]	Reading dBuV	Duty cycle Factor	※ A.F.+CL [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
2483.5	20.470	0.00	33.39	V	53.86	73.98	20.12	PK
2483.5	8.515	2.17	33.39	V	44.08	53.98	9.90	AV

Radiated Restricted Band Edges plot – Average Reading



Radiated Restricted Band Edges plot – Peak Reading

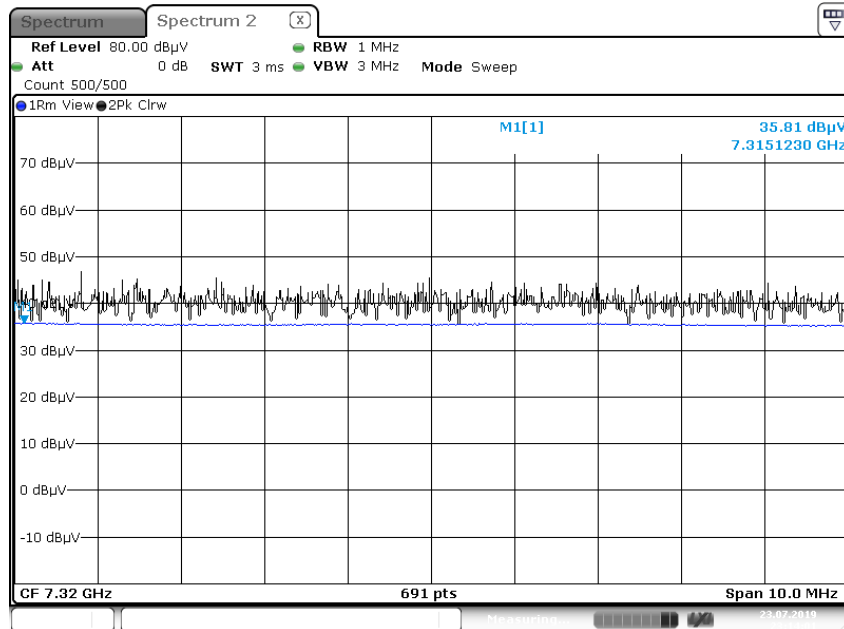


BT(LE) R.S.E 3rd Harmonic (LE(5.0) 1M 37byte/ch.19)

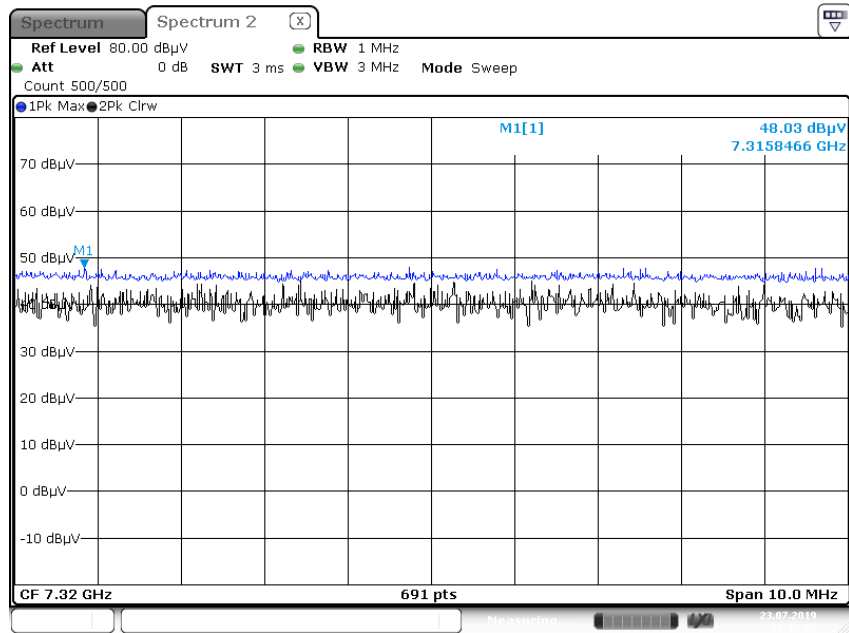
RSE

Frequency [MHz]	Reading dBuV	Duty cycle Factor	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
7320	48.03	0.00	9.14	V	57.17	73.98	16.81	PK
7320	35.81	2.17	9.14	V	47.12	53.98	6.86	AV

Radiated Spurious Emissions plot – Average Reading



Radiated Spurious Emissions plot – Peak Reading



Date: 23.JUL.2019 23:13:03

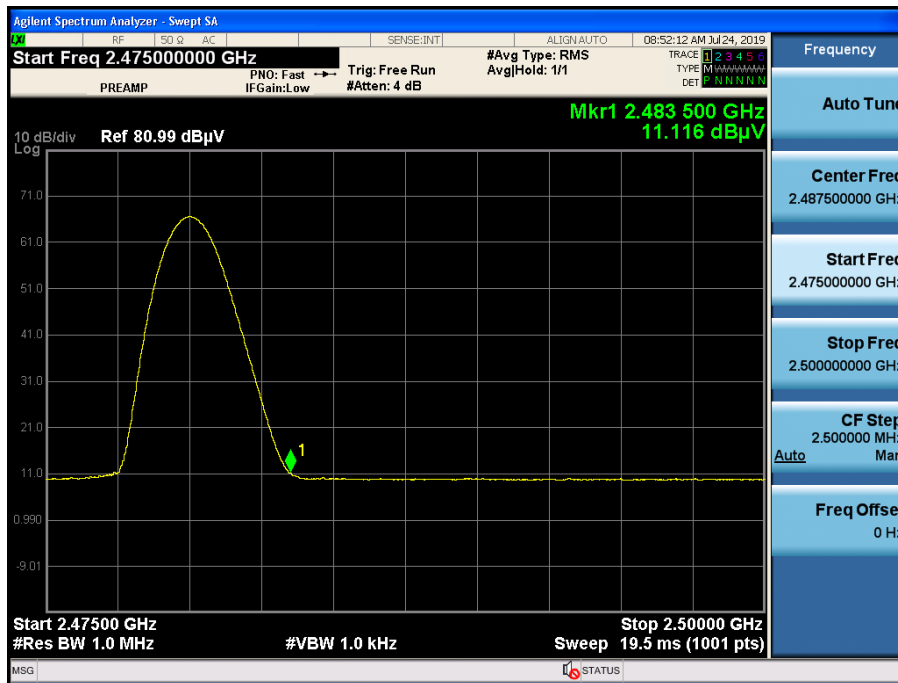
- Stainless-

BT Band Edge (DH5/ch.78)

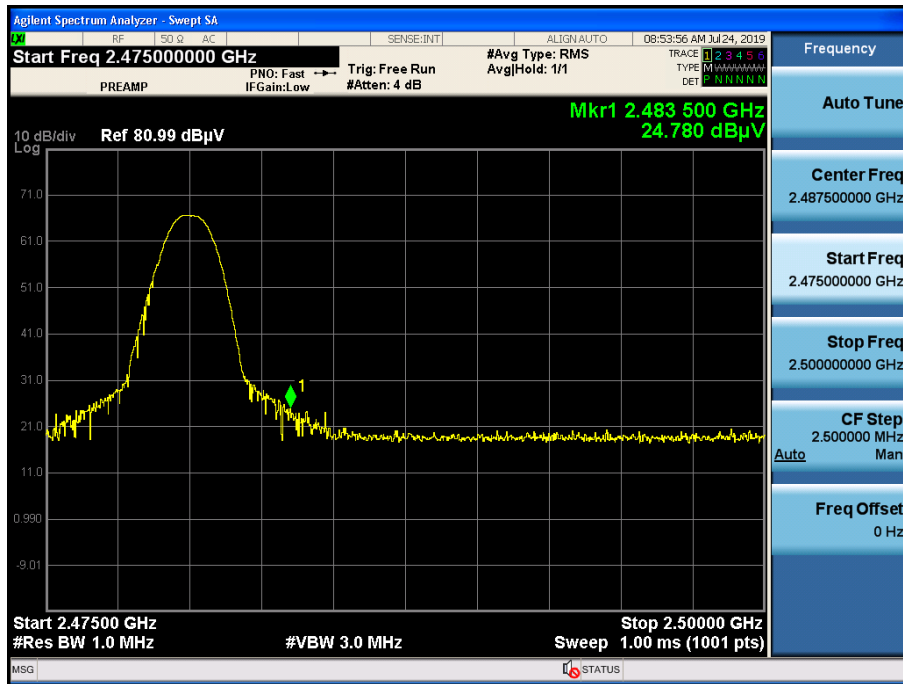
Bandedge

Frequency [MHz]	Reading dBuV	※ A.F.+CL [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
2483.5	24.780	33.39	V	58.17	73.98	15.81	PK
2483.5	11.116	33.39	V	44.51	53.98	9.47	AV

Radiated Restricted Band Edges plot – Average Reading



Radiated Restricted Band Edges plot – Peak Reading

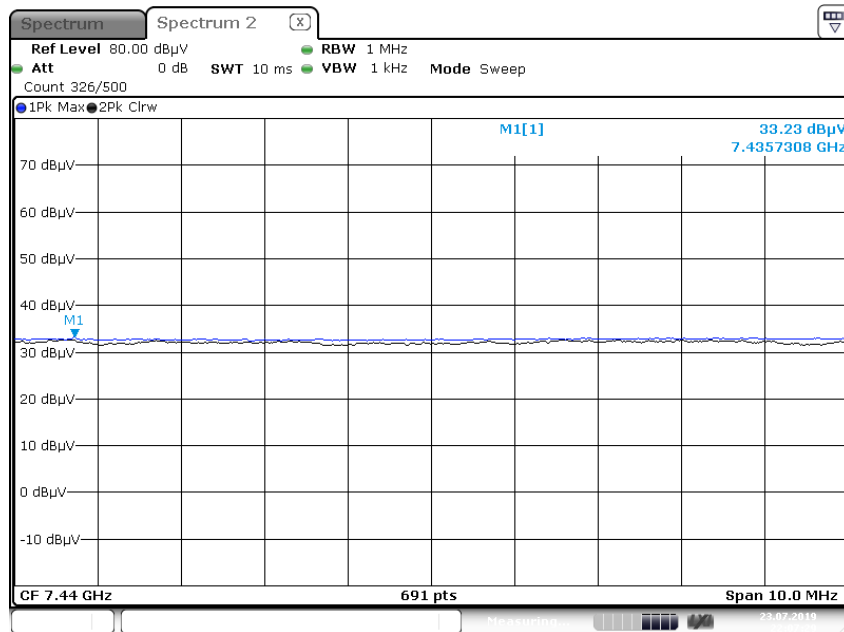


BT R.S.E 3rd Harmonic(DH5/ch.78)

RSE

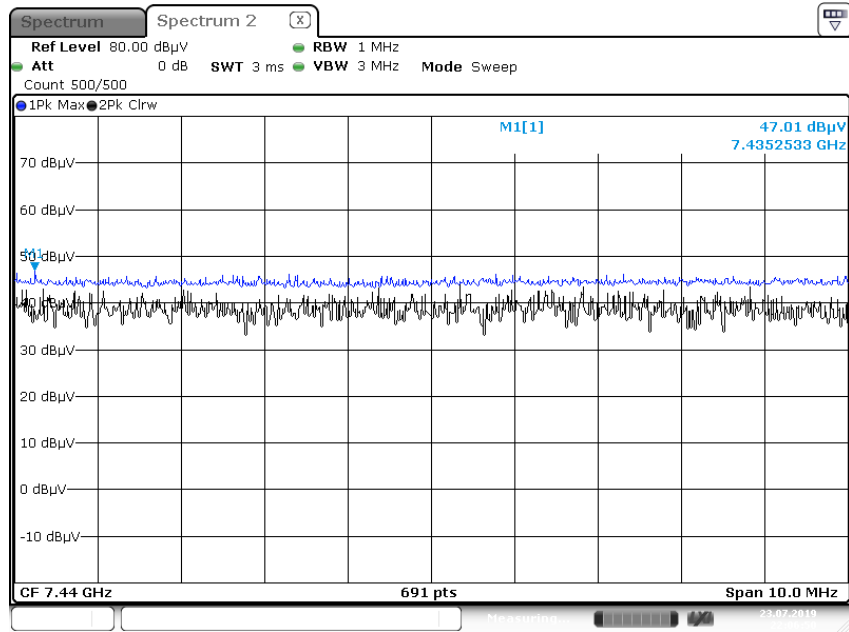
Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
7440	47.01	10.16	H	57.17	73.98	16.81	PK
7440	33.23	10.16	H	43.39	53.98	10.59	AV

Radiated Spurious Emissions plot – Average Reading



Date: 23.JUL.2019 22:07:29

Radiated Spurious Emissions plot – Peak Reading



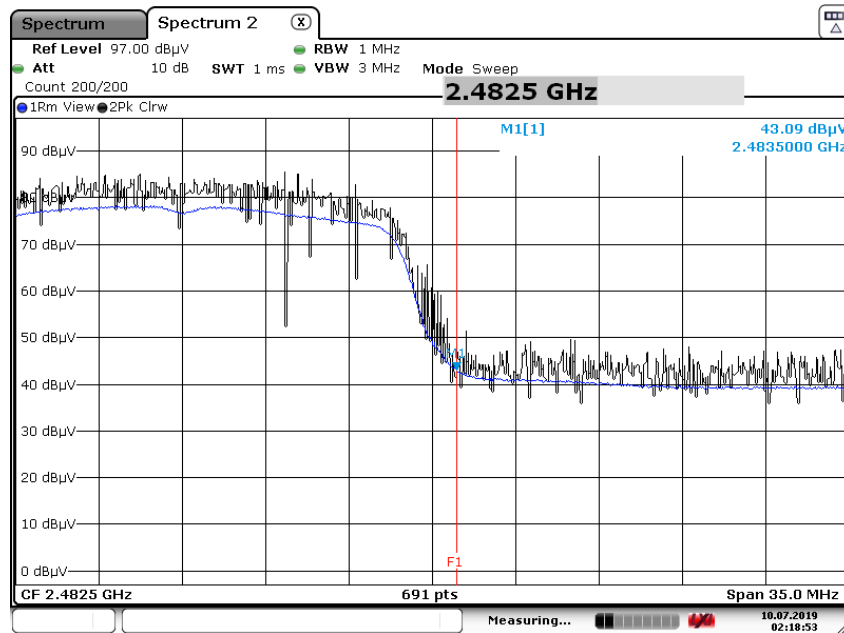
Date: 23.JUL.2019 22:06:51

DTS Band Edge (802.11n_6Mbps/ch.13)

Bandedge

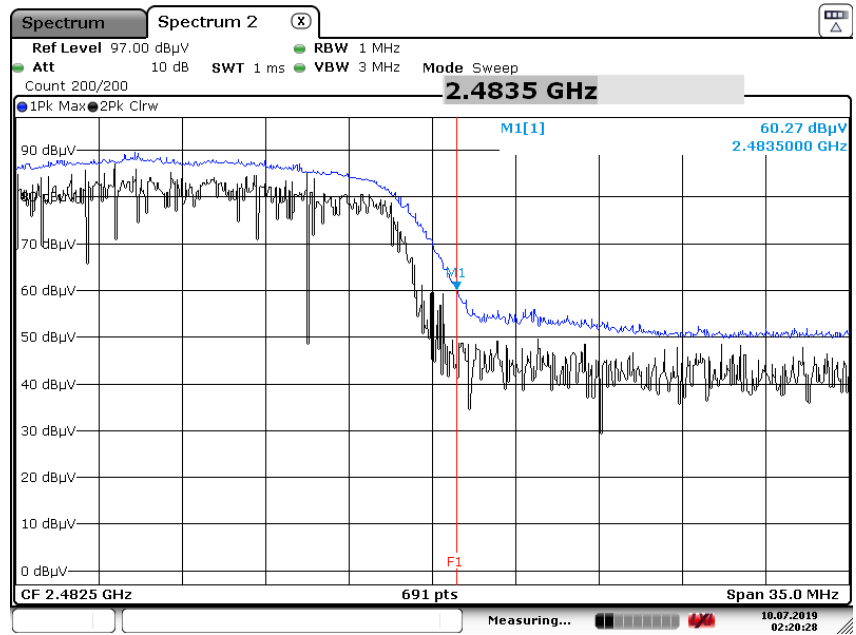
Frequency [MHz]	Reading dBuV	Duty Cycle Factor	※ A.F.+CL [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
2483.5	60.27	0.00	1.12	V	61.39	73.98	12.60	PK
2483.5	43.09	0.33	1.12	V	44.54	53.98	9.44	AV

Radiated Restricted Band Edges plot – Average Reading



Date: 10.JUL.2019 02:18:53

Radiated Restricted Band Edges plot – Peak Reading



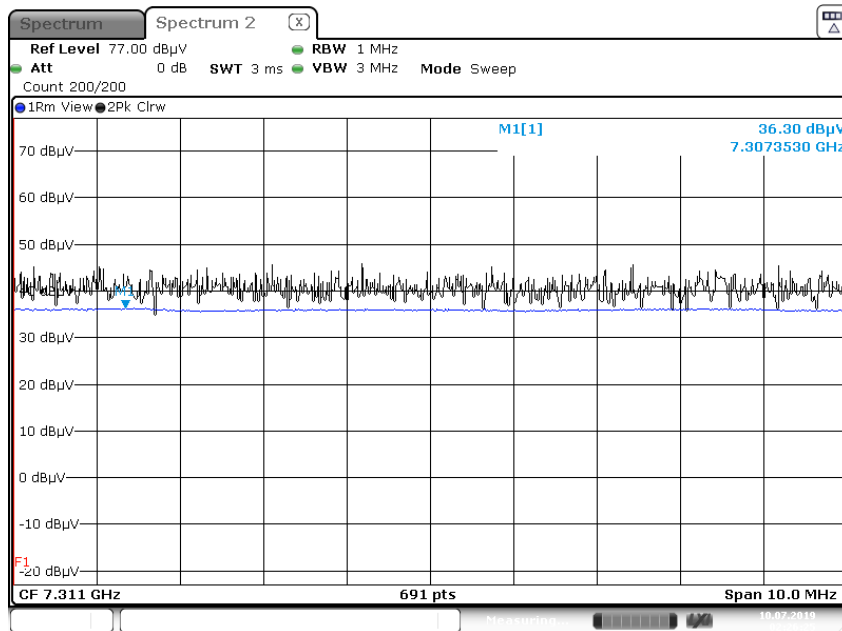
Date: 10.JUL.2019 02:20:28

DTS R.S.E 3rd Harmonic (802.11g 6Mbps/ch.6)

RSE

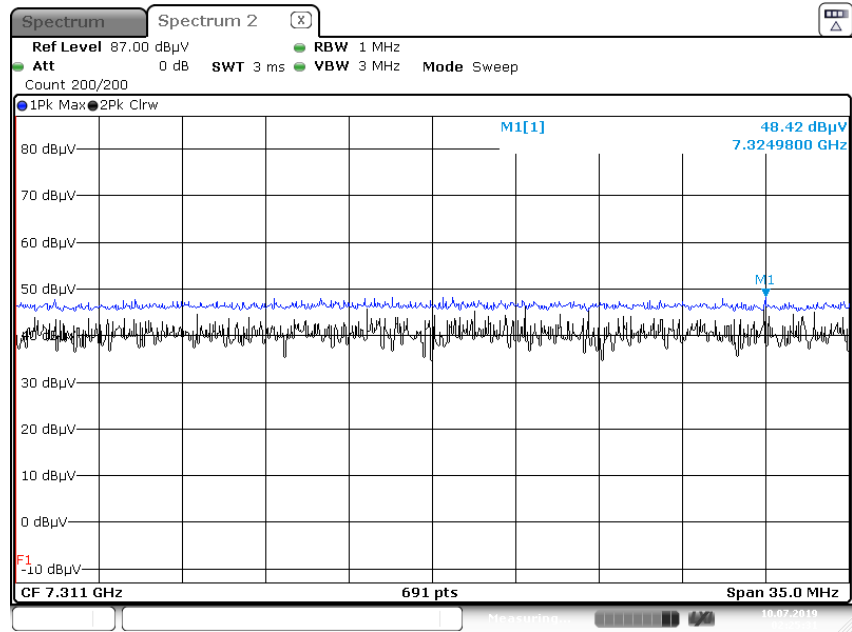
Frequency [MHz]	Reading dBuV	Duty Cycle Factor	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
7311	48.42	0.00	9.16	H	57.58	73.98	16.40	PK
7311	36.30	0.32	9.16	H	45.78	53.98	8.20	AV

Radiated Spurious Emissions plot – Average Reading



Date: 10.JUL.2019 02:26:25

Radiated Spurious Emissions plot – Peak Reading



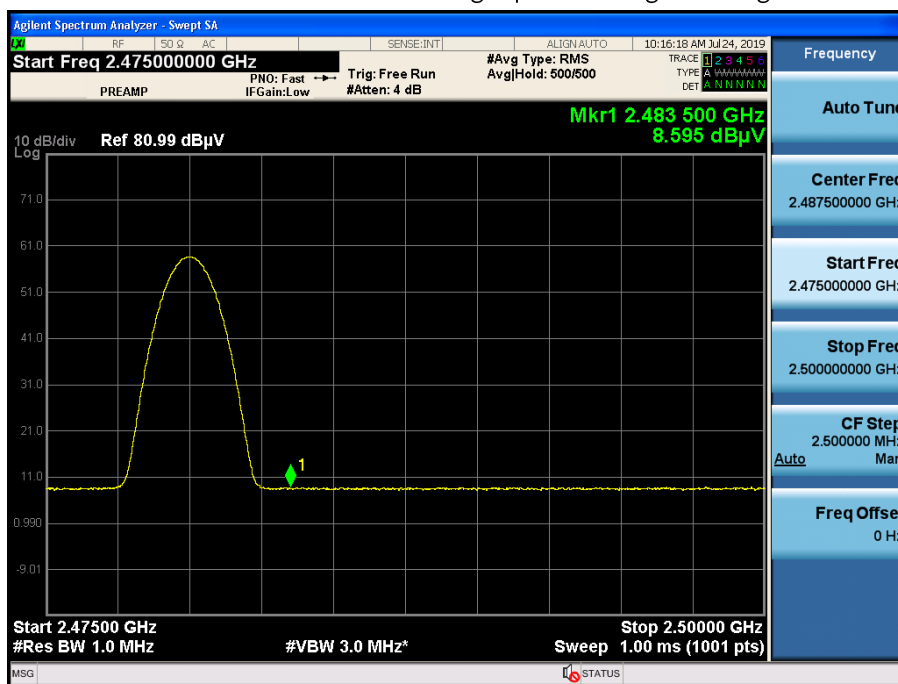
Date: 10.JUL.2019 02:25:31

BT(LE) Band Edge (LE(5.0) 1M 37byte/ch.39)

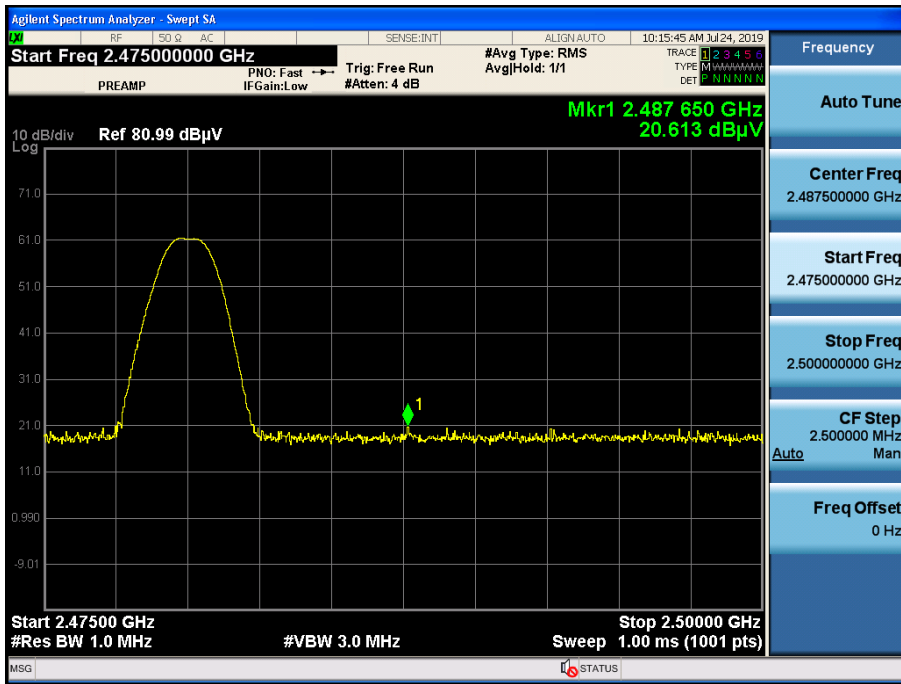
Bandedge

Frequency [MHz]	Reading dBuV	Duty cycle Factor	※ A.F.+CL [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
2483.5	20.613	0.00	33.39	V	54.00	73.98	19.98	PK
2483.5	8.595	2.17	33.39	V	44.16	53.98	9.83	AV

Radiated Restricted Band Edges plot – Average Reading



Radiated Restricted Band Edges plot – Peak Reading

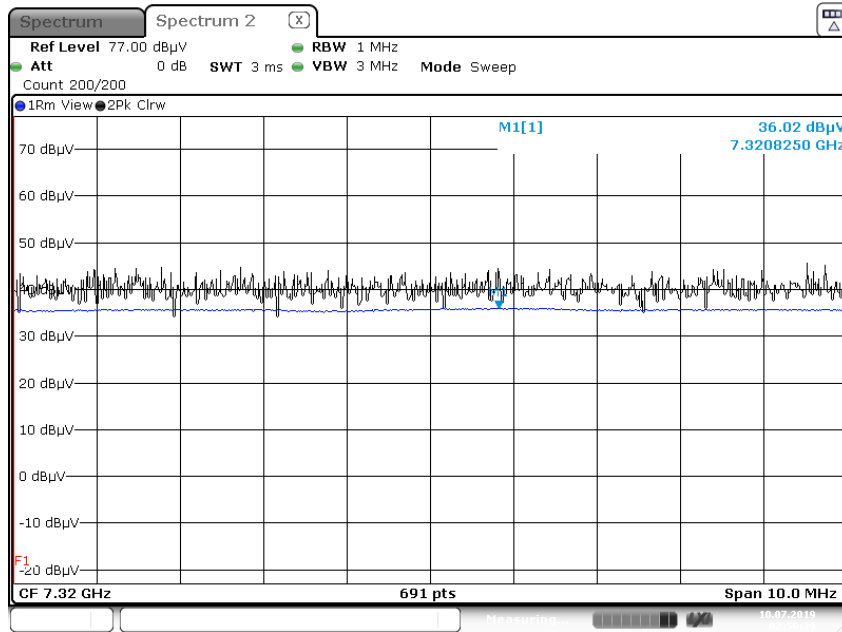


BT(LE) R.S.E 3rd Harmonic (LE(5.0) 1M 37byte/ch.19)

RSE

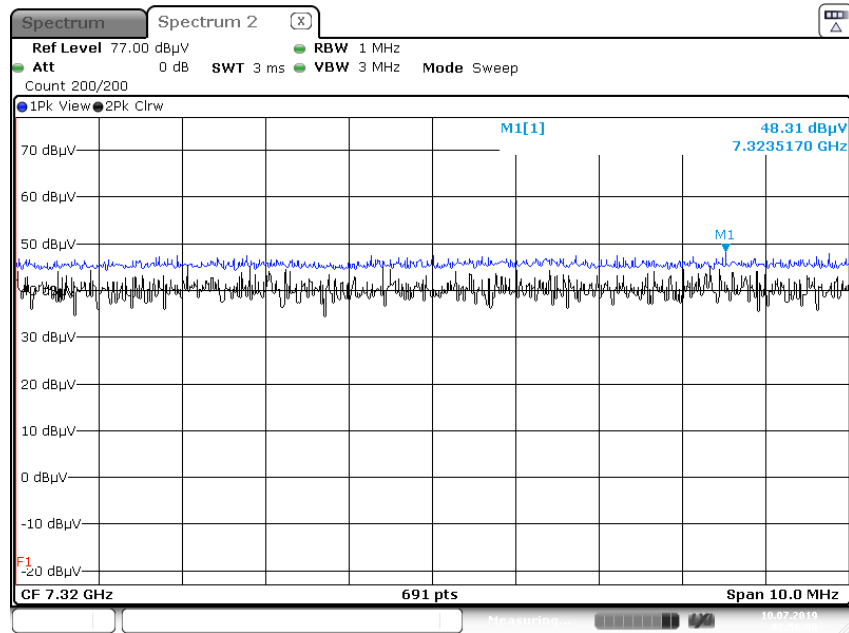
Frequency [MHz]	Reading dBuV	Duty cycle Factor	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
7320	48.31	0.00	9.14	V	57.45	73.98	16.53	PK
7320	36.02	2.17	9.14	V	47.33	53.98	6.65	AV

Radiated Spurious Emissions plot – Average Reading



Date: 10.JUL.2019 02:56:39

Radiated Spurious Emissions plot – Peak Reading



Date: 10.JUL.2019 02:56:00