

EVALUATION REPORT

Applicant Name:
SAMSUNG Electronics Co., Ltd.

Date of Issue:
July 29, 2022

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

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

FCC ID:	A3LSMA047F
APPLICANT:	SAMSUNG Electronics Co., Ltd.

Equipment Class(es) : TNE, DTS, NII

Rule Part(s) : 15, 22, 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 A3LSMA047FN. 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
A3LSMA047FN	TNE	2G3G Report	All sections
		LTE B5 Report	All sections
		LTE B41 Report	All sections
	DTS	DTS Report	All sections
	NII	DFS Test Report	All sections
		UNII Test Report	All sections



Report prepared by : Jae Mun Do
Engineer of Telecommunication testing center



Approved by : Jong Seok Lee
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	July 29, 2022	Initial Release

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	251	848.8	-22.86	40.48	-10.14	1.42	V	< 7.00	0.780	28.92
WCDMA850	4233	846.6	-31.80	31.38	-10.15	1.42	V		0.096	19.81
LTE B5	20625	846.5	-32.14	31.04	-10.15	1.42	H		0.089	19.47

Mode	Frequency (MHz)		Mode	SM-A047F/DSN (dBm)	SM-A047F/DS (dBm)	Deviation (dB)
	MHz	Ch.				
GSM850	848.8	251	VOICE	30.06	28.92	1.14
WCDMA850	846.6	4233	RMC	19.95	19.81	0.14
LTE B5 (B.W 5 MHz)	846.5	20625	QPSK	19.64	19.47	0.17

1.2 EQUIVALENT ISOTROPIC RADIATED POWER

Mode	Ch./ Freq.		Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol.	Limit	EIRP	
	channel	Freq.(MHz)						W	W	dBm
LTE B41	40620	2593.0	-21.51	15.81	10.62	2.53	H	< 2.00	0.245	23.90

Modulation	Frequency		Mode	SM-A047F/DSN (dBm)	SM-A047F/DS (dBm)	Deviation (dB)
	MHz	Ch.				
LTE B41 (B.W 5 MHz)	2593.0	40620	QPSK	25.10	23.90	1.20

1.3 RADIATED SPURIOUS EMISSIONS

Modulation	Frequency		Mode	SM-A047F/DSN (dBm)	SM-A047F/DS (dBm)	Deviation (dB)
	MHz	Ch.				
GSM850	2 546.40	251	VOICE	-37.36	-41.14	3.78
WDMA850	2 479.20	4132	RMC	-49.62	-52.60	2.98
LTE B5 (B.W 5 MHz)	3 306.00	20425	QPSK	-49.41	-49.61	0.20
LTE B41 (B.W 5 MHz)	9 994.00	39675	QPSK	-34.05	-39.07	5.02

Mode, Channel, (Frequency)	Freq. (MHz)	Measured Level (dBm)	Ant. Gain (dBd)	Substitute Level (dBm]	C.L	Pol.	Result (dBm)
GSM850 CH 251 (848.8)	2 546.40	-45.41	10.70	-49.32	2.52	H	-41.14
WDMA850 CH 4132 (826.4)	2 479.20	-55.88	10.54	-60.66	2.48	H	-52.60
LTE B5 CH 20425 (826.5)	3 306.00	-57.44	12.13	-58.85	2.90	V	-49.61
LTE B41 CH 39675 (2498.5)	9 994.00	-49.34	11.19	-44.99	5.27	V	-39.07

2. Summary of the spot check for Unlicensed EMC

Mod	Test Item	Mod / Channel	Measured Frequency [MHz]	SM-A047F/DSN Result [dB μ V/m]		SM-A047F/DS Result [dB μ V/m]		Deviation (dB)	
				Peak	Average	Peak	Average	Peak	Average
DTS	Band Edge	802.11g_6Mbps/ch.13	2483.5 MHz~2500 MHz (2484 MHz)	69.45	51.76	68.26	50.97	-1.19	-0.79
	RSE	802.11b 1Mbps/ch.1	7236 MHz	55.15	45.18	54.55	44.16	-0.60	-1.02
UNII	Band Edge(Avg)	802.11ac(20M)_MCS0/ch.100	5460 MHz~5470 MHz	65.63	-	64.54	-	-1.09	-
	Band Edge(Peak)	802.11a(20M)_6Mbps/ch.64	5350 MHz~5460 MHz	-	51.54	-	49.15	-	-2.39
	RSE	802.11a(20M)_6Mbps/ch.60	10600 MHz	55.00	46.60	55.45	44.82	0.45	-1.78

3. Test Plot

DTS Band Edge (802.11g 6 Mbps_ch13)

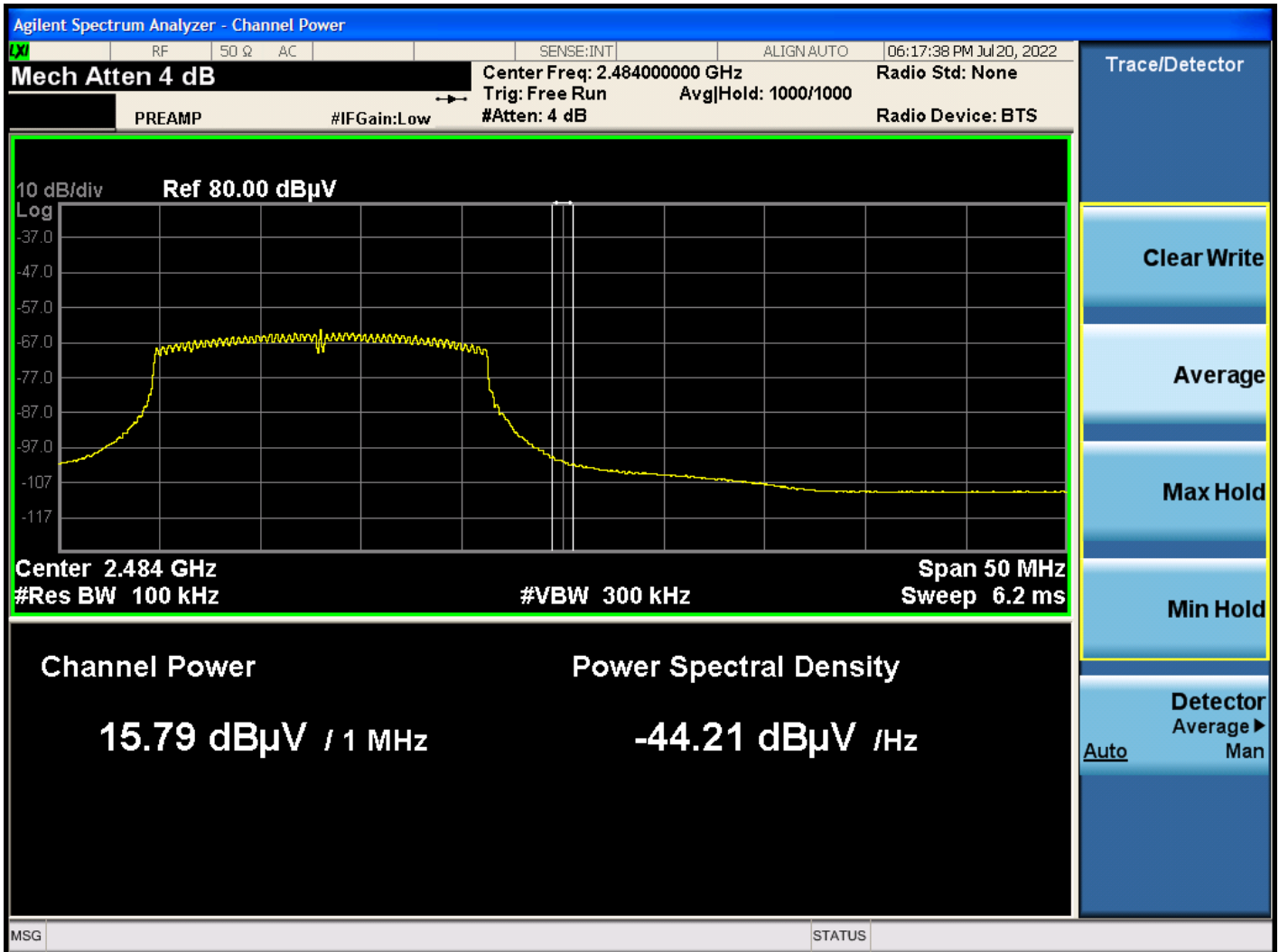
Bandedge

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor[dB]	A.F+C.L+D.F [dB]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
2483.5	33.39	0.00	34.87	H	68.26	73.98	5.72	PK
#2483.5~2484.5	15.79	0.31	34.87	H	50.97	53.98	3.01	AV
2484.5	15.43	0.31	34.87	H	50.61	53.98	3.37	AV

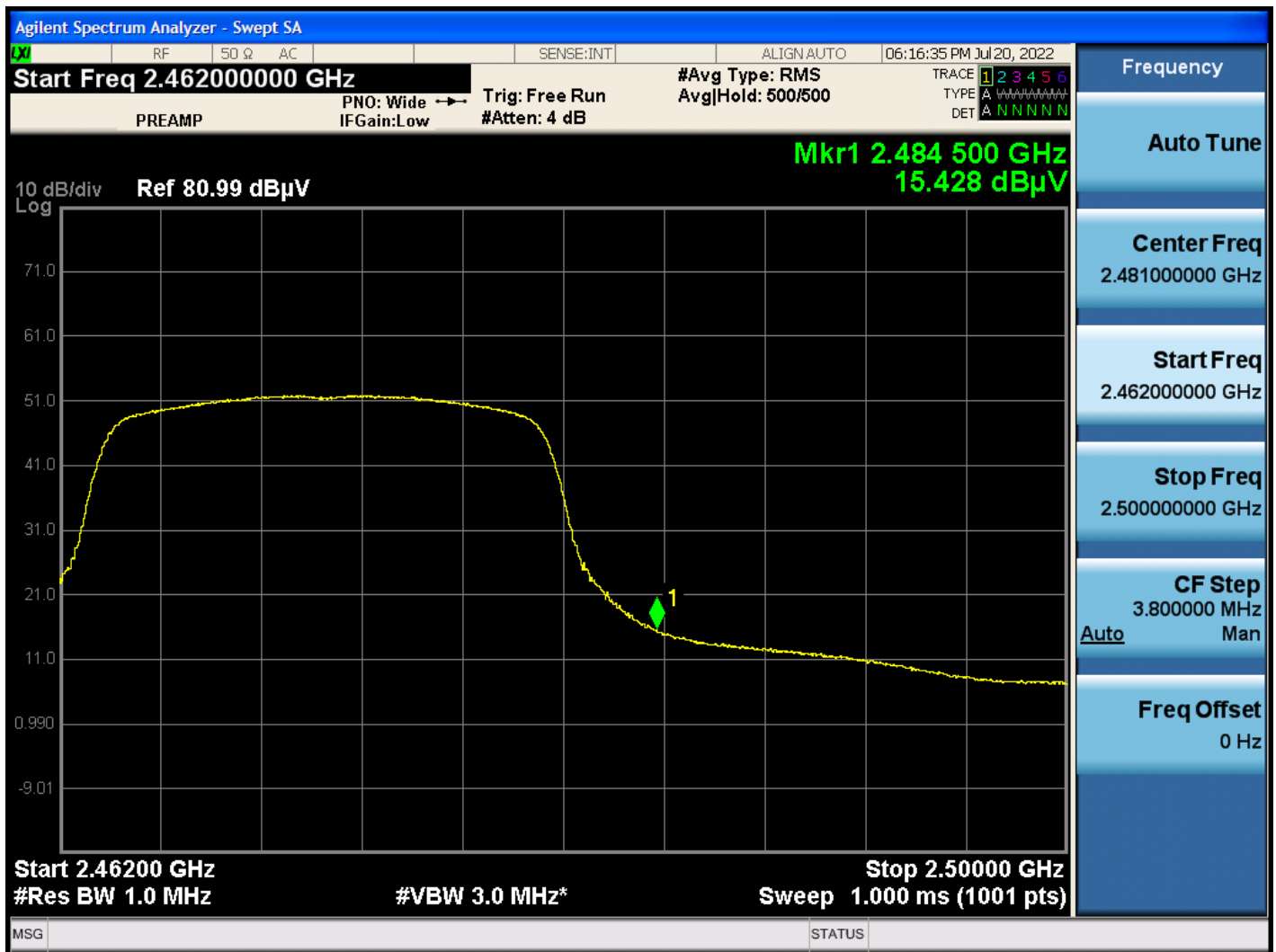
[Radiated Restricted Band Edges plot – Peak Result]



[Radiated Restricted Band Edges plot – Average Result (2483.5~2484.5 MHz)]



[Radiated Restricted Band Edges plot – Average Result (2484.5 MHz)]

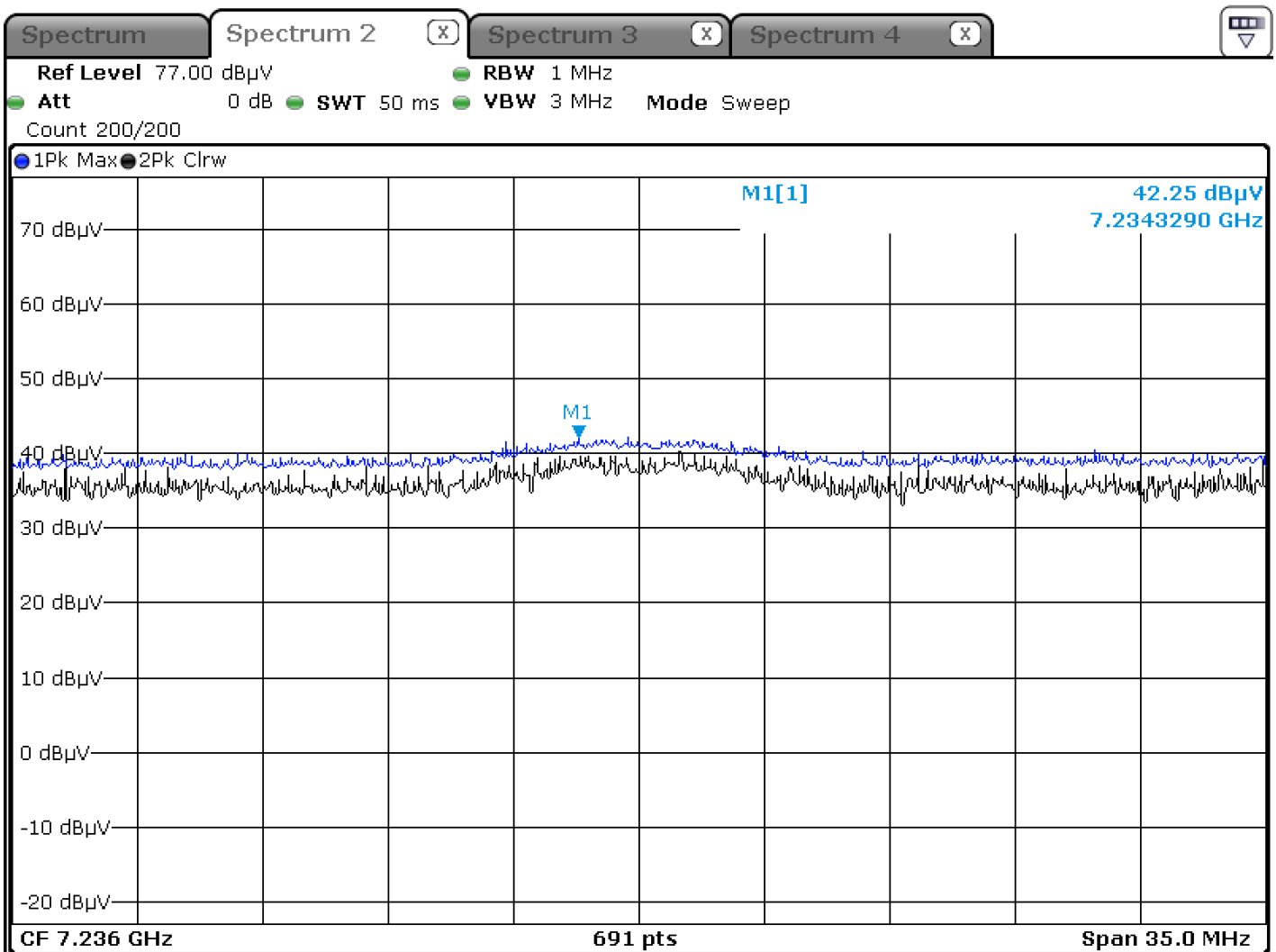


DTS R.S.E 3rd Harmonic(802.11b 1 Mbps Ch.1)

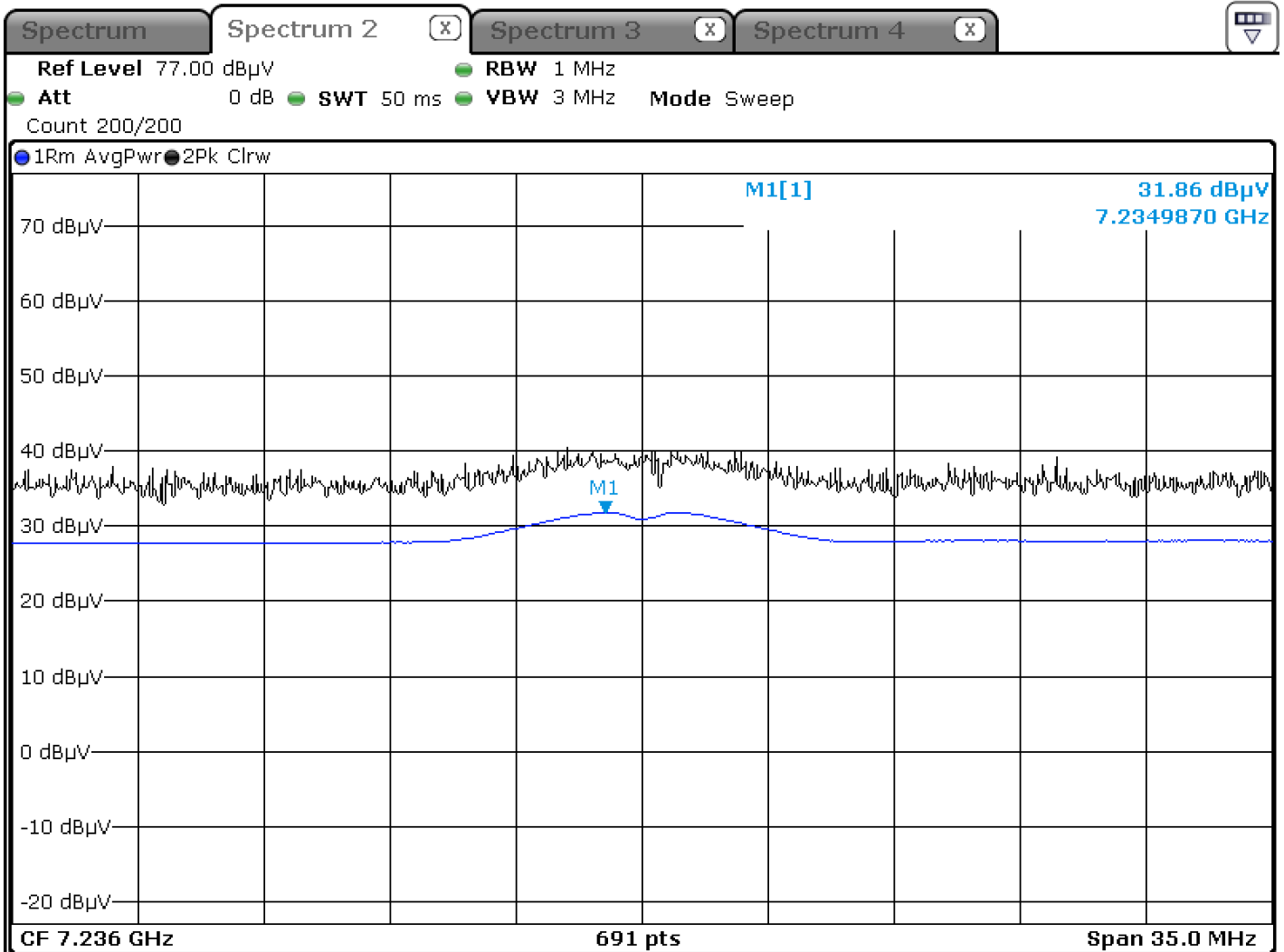
RSE

Frequency [MHz]	Measured Value [dBμV]	A.F+C.L-A.G+D.F [dB]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
7236	42.25	12.30	H	54.55	73.98	19.44	PK
7236	31.86	12.30	H	44.16	53.98	9.83	AV

[Radiated Spurious Emissions plot – Peak Result]



[Radiated Spurious Emissions plot – Average Result]

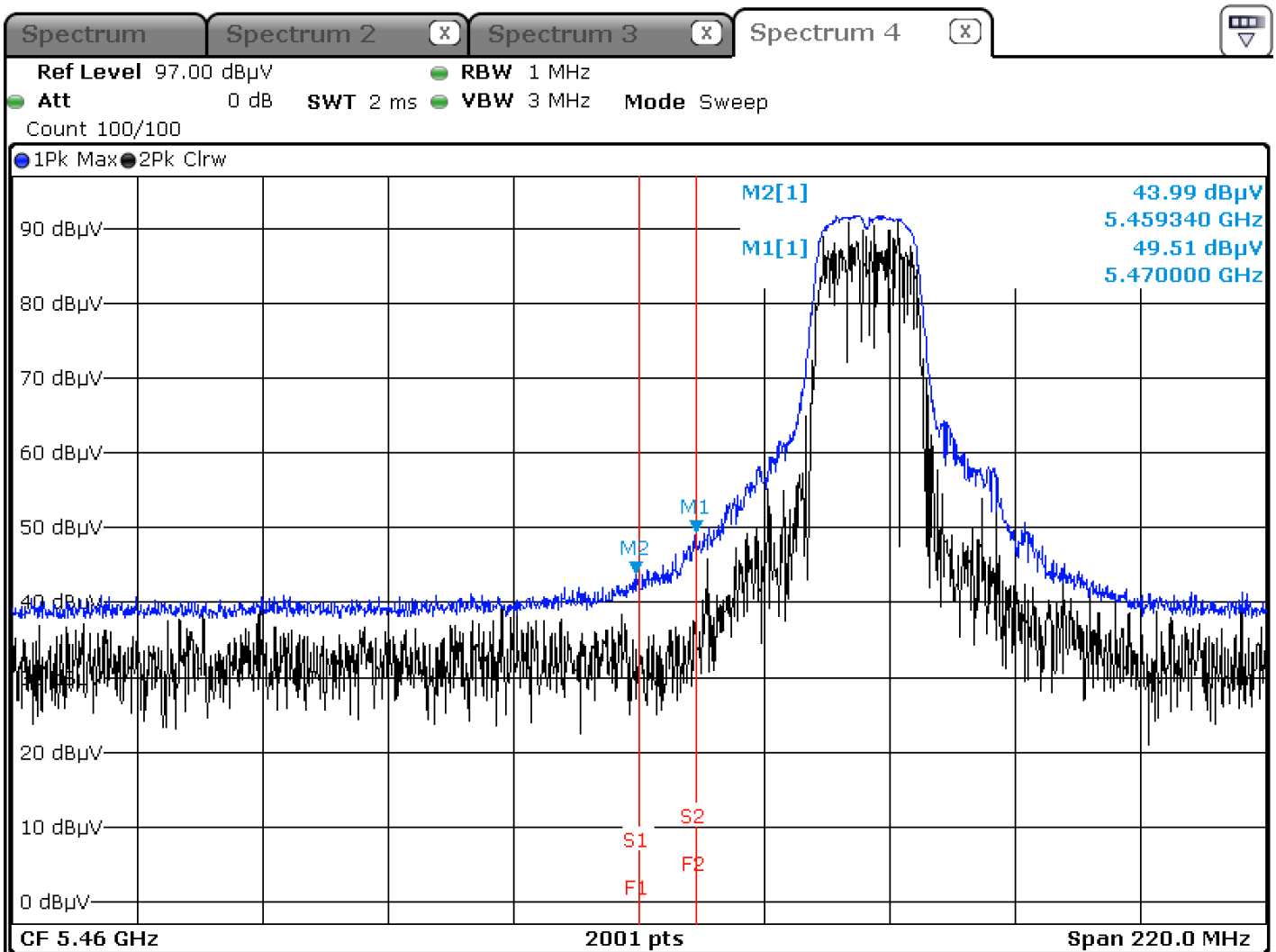


U-NII Band Edge Peak (802.11ac_20 MHz BW 6.5 Mbps_ch.100)

Bandedge

Frequency [MHz]	Measured Value [dBμV]	A.F+C.L-A.G +ATT+D.F [dB]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
5470	49.51	15.03	H	64.54	68.20	3.66	PK

[Radiated Restricted Band Edges plot – Peak Result]

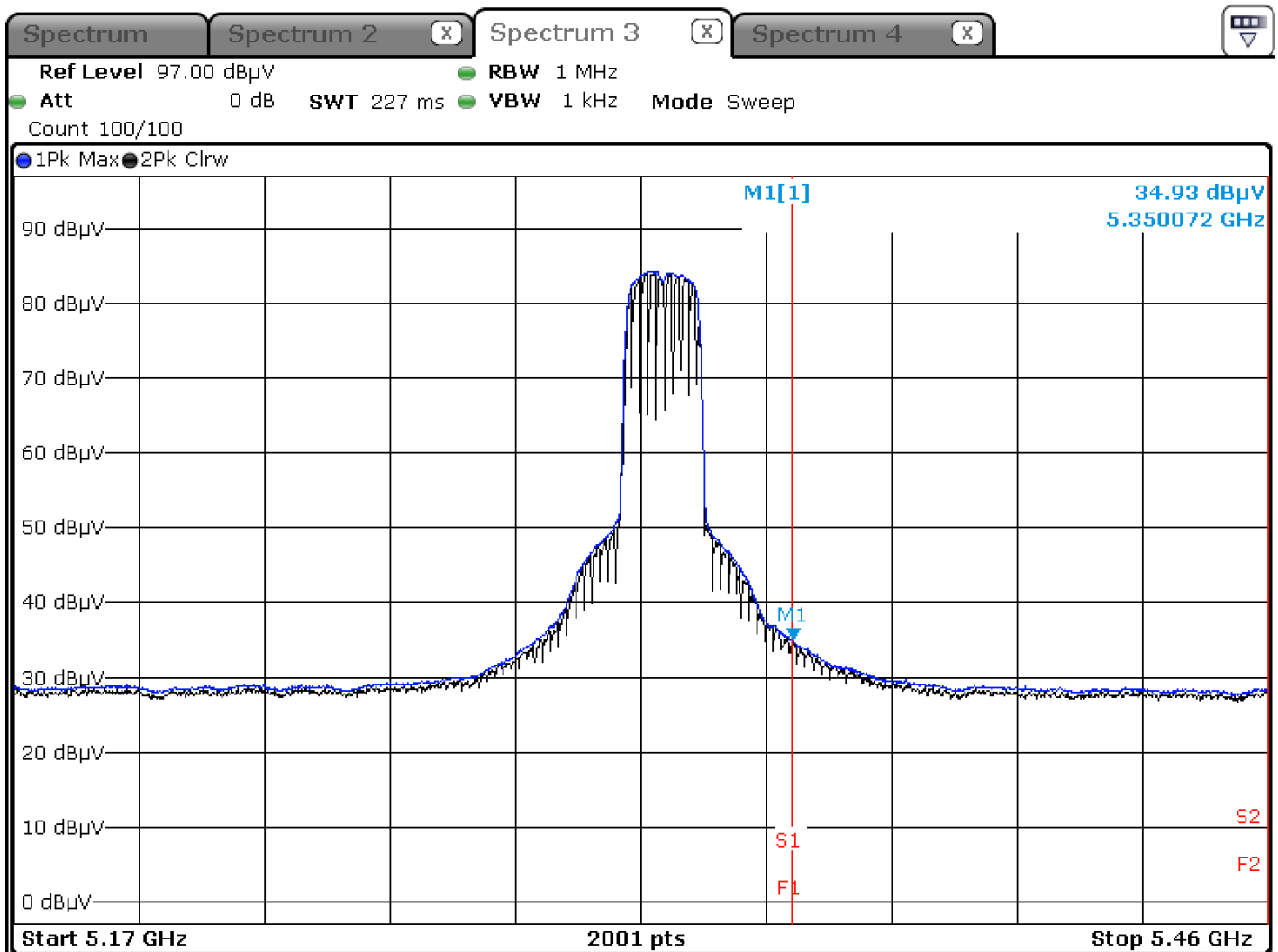


U-NII Band Edge Avg (802.11a 6 Mbps_ch.64)

Bandedge

Frequency [MHz]	Measured Value [dBμV]	A.F+C.L-A.G +ATT+D.F [dB]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
5350	34.93	14.22	H	49.15	53.98	4.83	AV

[Radiated Restricted Band Edges plot – Average Result]

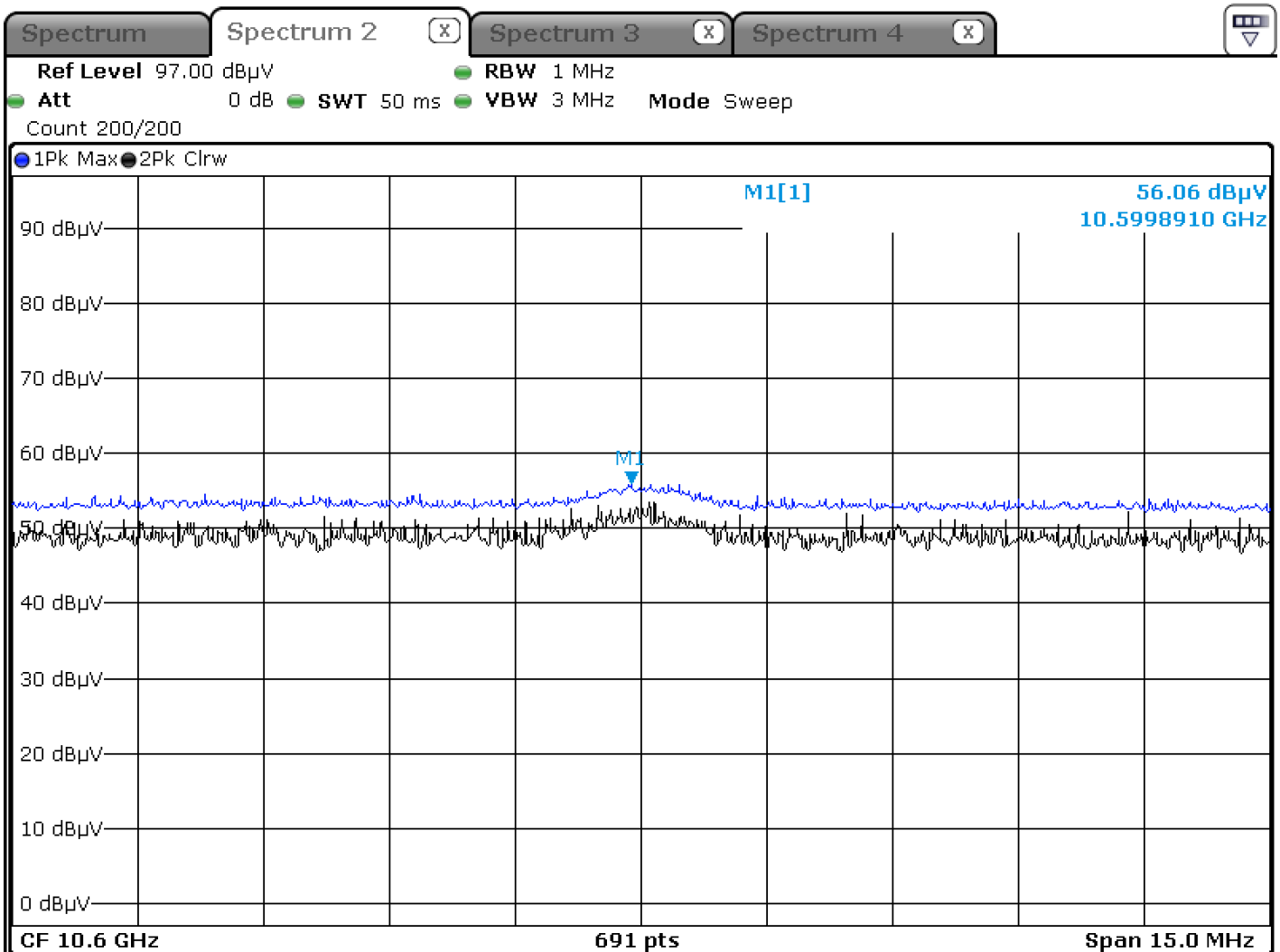


U-NII R.S.E 3rd Harmonic (802.11a 6 Mbps_ch.60)

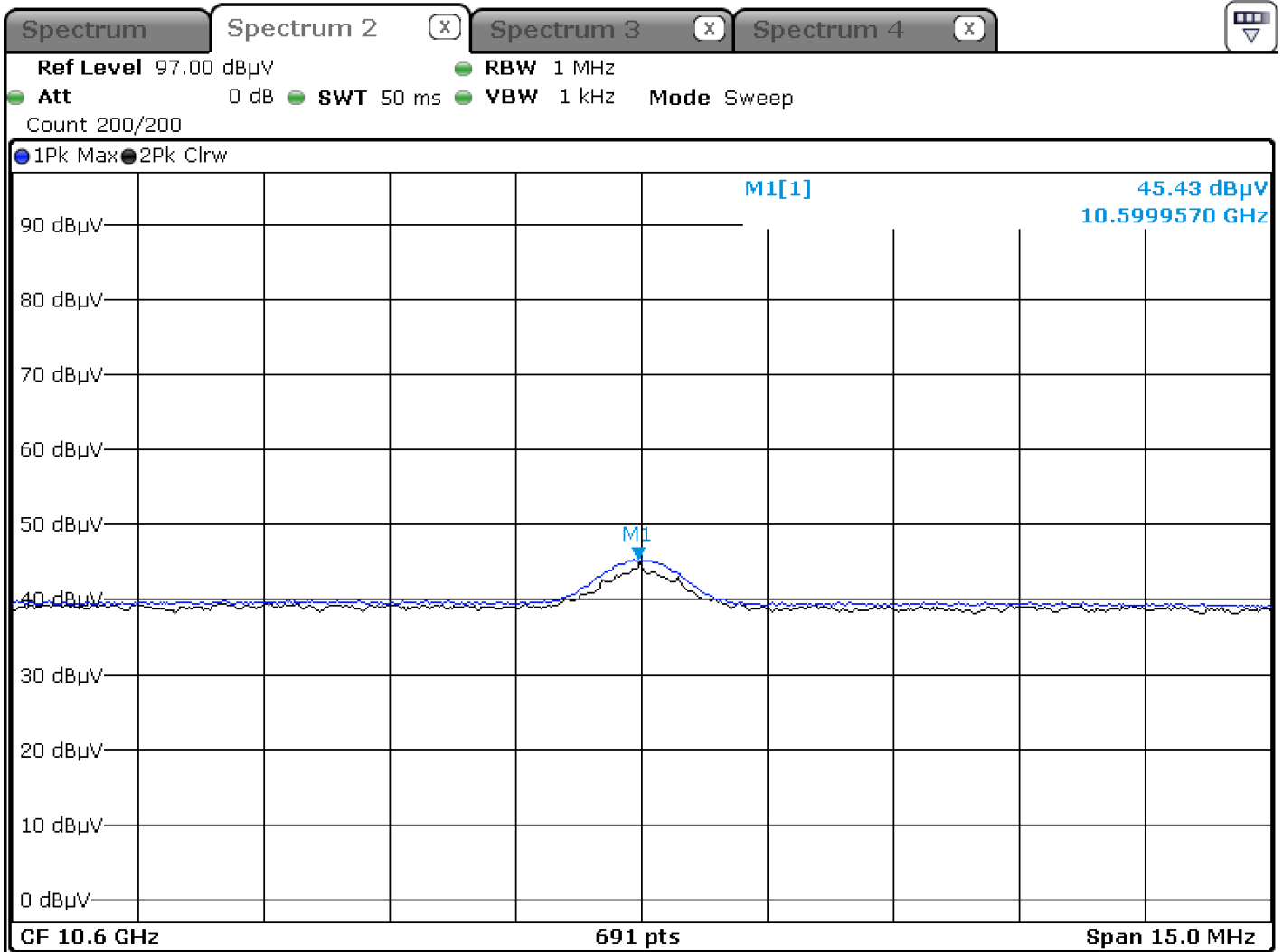
RSE

Frequency [MHz]	Measured Value [dBμV]	C.L.+A.F.+D.F-A.G [dB]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
10600	56.06	-0.61	V	55.45	73.98	18.53	PK
10600	45.43	-0.61	V	44.82	53.98	9.16	AV

[Radiated Spurious Emissions plot – Peak Result]



[Radiated Spurious Emissions plot – Average Result]



4. List of test equipment

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
H.P.F	FBSR-02B(WHK1.2/15 G-10EF)	T&M SYSTEM	-	02/18/2023	Annual
H.P.F	FBSR-02B(WHK3.3/18 G-10EF)	T&M SYSTEM	-	02/18/2023	Annual
Power Splitter(DC ~ 26.5 GHz)	11667B	Hewlett Packard	11275	03/11/2023	Annual
DC Power Supply	E3632A	Agilent	MY40010147	06/21/2023	Annual
Dipole Antenna	UHAP	Schwarzbeck	557	04/05/2023	Biennial
Dipole Antenna	UHAP	Schwarzbeck	558	04/05/2023	Biennial
Chamber	SU-642	ESPEC	93008124	03/04/2023	Annual
Horn Antenna(1 ~ 18 GHz)	BBHA 9120D	Schwarzbeck	147	08/30/2022	Biennial
Horn Antenna(1 ~ 18 GHz)	BBHA 9120D	Schwarzbeck	9120D-1298	09/15/2023	Biennial
Horn Antenna(15 ~ 40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170342	10/13/2022	Biennial
Horn Antenna(15 ~ 40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170124	04/12/2023	Biennial
Signal Analyzer(10 Hz ~ 26.5 GHz)	N9020A	Agilent	MY52090906	05/02/2023	Annual
ATTENUATOR(20 dB)	8493C	Hewlett Packard	17280	05/18/2023	Annual
Spectrum Analyzer(10 Hz ~ 40 GHz)	FSV40	REOHDE & SCHWARZ	100931	09/29/2022	Annual
Base Station	8960 (E5515C)	Agilent	MY48360800	08/18/2022	Annual
Loop Antenna(9 kHz ~ 30 MHz)	FMZB1513	Schwarzbeck	1513-333	03/17/2024	Biennial
Bilog Antenna	VULB9160	Schwarzbeck	3150	03/03/2023	Biennial
Hybrid Antenna	VULB9168	Schwarzbeck	760	02/22/2023	Biennial
Wideband Radio Communication Tester	MT8821C	Anritsu Corp.	6262116770	07/05/2023	Annual
Wideband Radio Communication Tester	MT8820C	Anritsu Corp.	6200863156	12/29/2022	Annual
SIGNAL GENERATOR (100 kHz ~ 40 GHz)	SMB100A	REOHDE & SCHWARZ	177633	07/05/2023	Annual
Signal Analyzer(5 Hz ~ 40.0 GHz)	N9030B	KEYSIGHT	MY55480167	05/30/2023	Annual
FCC LTE Mobile Conducted RF Automation Test Software	-	HCT CO., LTD.,	-	-	-

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
Controller(Antenna mast)	CO3000	Innco system	CO3000-4p	N/A	N/A
Antenna Position Tower	MA4640/800-XP-EP	Innco system	N/A	N/A	N/A
Controller	EM1000	Audix	060520	N/A	N/A
Turn Table	N/A	Audix	N/A	N/A	N/A
Loop Antenna	FMZB 1513	Rohde & Schwarz	1513-333	03/17/2024	Biennial
Hybrid Antenna	VULB 9168	Schwarzbeck	760	02/22/2023	Biennial
Horn Antenna	BBHA 9120D	Schwarzbeck	02299	03/24/2024	Biennial
Horn Antenna (15 GHz ~ 40 GHz)	BBHA9170	Schwarzbeck	BBHA9170541	11/16/2023	Biennial
Spectrum Analyzer	FSV40-N	Rohde & Schwarz	102168	07/04/2023	Annual
Signal Analyzer	N9030A	Agilent	MY49431210	01/11/2023	Annual
Band Reject Filter	WRCJV12-4900-5100-5900- 6100-50SS	Wainwright Instruments	5	06/13/2023	Annual
Band Reject Filter	WRCJV12-4900-5100-5900- 6100-50SS	Wainwright Instruments	6	06/13/2023	Annual
Band Reject Filter	WRCJV2400/2483.5- 2370/2520-60/12SS	Wainwright Instruments	2	01/06/2023	Annual
Band Reject Filter	WRCJV5100/5850-40/50- 8EEK	Wainwright Instruments	1	02/07/2023	Annual
High Pass Filter	WHK3.0/18G-10EF	Wainwright Instruments	8	01/21/2023	Annual
High Pass Filter	WHKX8-6090-7000-18000- 40SS	Wainwright Instruments	25	01/21/2023	Annual
Attenuator (3 dB)	18B-03	Api tech.	1	01/21/2023	Annual
Attenuator(10 dB)	8493C-10	Agilent	08285	01/21/2023	Annual
Power Amplifier	CBLU1183540	CERNEX	22964	01/21/2023	Annual
Power Amplifier	CBL06185030	CERNEX	22965	01/21/2023	Annual
Power Amplifier	CBL18265035	CERNEX	22966	12/02/2022	Annual
Power Amplifier	CBL26405040	CERNEX	25956	03/11/2023	Annual