

EVALUATION REPORT

Applicant Name:
SAMSUNG Electronics Co., Ltd.

Date of Issue:
January 15, 2021

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:	A3LSMA725F
APPLICANT:	SAMSUNG Electronics Co., Ltd.

Equipment Class(es) : PCE, DSS, DTS, UNII, DXX

Rule Part(s) : 15, 22, 24, 27, 2, 90

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 A3LSMA725M
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
A3LSMA725M	PCE	2G, 3G Report	All sections
		LTE B2 Report	All sections
		LTE B5 Report	All sections
		LTE B12(17) Report	All sections
		LTE B26 Report (Part 22)	All sections
		LTE B26 Report (Part 90)	All sections
		LTE B41 Report	All sections
		LTE B66(4) Report	All sections
	DSS	Bluetooth Report	All sections
	DTS	DTS Report	All sections
		BT LE Report	All sections
	NII	UNII Test Report	All sections
	DXX	NFC Report	All sections



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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	January 15, 2021	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	128	824.2	-23.74	39.66	-10.25	1.39	V	< 7.00	0.633	28.02
WCDMA850	4132	826.4	-32.32	31.25	-10.24	1.40	H		0.092	19.61
LTE B5	20450	829.0	-32.84	30.87	-10.22	1.40	H		0.084	19.25
LTE B26(22)	26865	831.5	-32.23	31.60	-10.21	1.40	H		0.100	19.99
LTE B26(90)	26765	821.5	-32.54	30.76	-10.26	1.39	H		0.082	19.11

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	23025	700.5	-31.93	28.98	-9.92	1.28	H	< 3.00	0.060	17.78



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Mode	Frequency (MHz)		Mode	SM-A725M/DS (dBm)	SM-A725F/DS (dBm)	Deviation (dB)
	MHz	Ch.				
GSM850	824.2	128	VOICE	26.64	28.02	-1.38
WCDMA850	826.4	4132	RMC	19.92	19.61	0.31
LTE B5 (B.W 10MHz)	829.0	20450	QPSK	18.74	19.25	-0.10
LTE B12 (B.W 3MHz)	700.5	23025	QPSK	17.68	17.78	-0.10
LTE B26(22) (B.W 15MHz)	831.5	26865	QPSK	19.45	19.99	-0.54
LTE B26(90) (B.W 15MHz)	821.5	26765	QPSK	18.61	19.11	-0.50

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
GSM1900	512	1850.2	-13.88	20.20	10.10	2.11	V	< 2.00	0.659	28.19
WCDMA1900	9262	1852.4	-19.81	14.27	10.10	2.11	V		0.168	22.26
LTE B2	18607	1850.7	-19.68	14.40	10.10	2.11	V		0.173	22.39
LTE B41	39750	2506.0	-24.09	13.15	10.73	2.50	V		0.137	21.38

Mode	Ch./ Freq.		Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol.	Limit	EIRP	
	channel	Freq.(MHz)						W	W	dBm
WCDMA1700	1513	1752.6	-18.43	15.32	10.00	2.06	H	< 1.00	0.212	23.26
LTE B66	132657	1778.5	-18.31	15.34	10.05	2.07	H		0.215	23.32

Modulation	Frequency		Mode	SM-A725M/DS (dBm)	SM-A725F/DS (dBm)	Deviation (dB)
	MHz	Ch.				
GSM1900	1850.2	512	VOICE	28.01	28.19	-0.18
WCDMA1700	1752.6	1513	RMC	22.86	23.26	-0.40
WCDMA1900	1852.4	9262	RMC	21.93	22.26	-0.33
LTE B2 (B.W 1.4MHz)	1850.7	18607	QPSK	21.88	22.39	-0.51
LTE B41 (B.W 20MHz)	1850.7	18607	QPSK	22.04	21.38	0.66
LTE B66 (B.W 3MHz)	1778.5	132657	QPSK	21.94	23.32	-1.38

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 251 (848.8)	2,546.40	-27.01	10.88	-30.29	2.52	H	-21.93
GSM1900 CH 661 (1880)	7,520.00	-58.36	11.30	-47.79	4.46	H	-40.95
WDM850 CH 4233 (846.6)	3,386.40	-58.87	12.63	-59.95	2.94	H	-50.26
WDM81700 CH 1513 (1752.6)	7,010.40	-57.83	11.65	-49.81	4.32	H	-42.48
WDM81900 CH 9262 (1852.4)	7,409.60	-56.01	11.13	-45.83	4.45	H	-39.15
LTE B2 CH 18900 (1880.0)	7,520.00	-58.92	11.30	-48.35	4.46	V	-41.51
LTE B5 CH 20450 (829.0)	3,316.00	-57.73	12.38	-58.71	2.91	H	-49.24
LTE B12 CH 23025 (700.5)	1,401.00	-46.38	7.60	-54.64	1.85	H	-48.89
LTE B26(part22) CH 26915 (836.5)	3346.00	-57.39	12.48	-58.38	2.92	H	-48.82
LTE B26(part90) CH 26765 (821.5)	3286.00	-55.50	12.15	-56.64	2.88	H	-47.37
LTE B41 CH 41540 (2685.0)	10,740.00	-46.69	10.90	-42.15	5.52	H	-36.77
LTE B66 CH 132322 (1745.0)	6,980.00	-55.98	11.85	-47.81	4.28	V	-40.24

Modulation	Frequency		Mode	SM-A725M/DS (dBm)	SM-A725F/DS (dBm)	Deviation (dB)
	MHz	Ch.				
GSM850	2,546.40	251	VOICE	-21.71	-21.93	-0.22
GSM1900	7,520.00	661	RMC	-40.45	-40.95	-0.50
WDMA850	3,386.40	4233	RMC	-49.46	-50.26	-0.80
WDMA1700	7,010.40	1513	RMC	-41.47	-42.48	-1.01
WDMA1900	7,409.60	9262	RMC	-39.48	-39.15	0.33
LTE B2 (B.W 1.4MHz)	7,520.00	18900	QPSK	-40.26	-41.51	-1.25
LTE B5 (B.W 10MHz)	3,316.00	20450	QPSK	-48.53	-49.24	-0.71
LTE B12 (B.W 3MHz)	1,401.00	23025	QPSK	-48.11	-48.89	-0.78
LTE B26(part22) (B.W 15MHz)	3346.00	26915	QPSK	-49.40	-48.82	0.58
LTE B26(part90) (B.W 15MHz)	3286.00	26765	QPSK	-47.91	-47.37	0.54
LTE B41 (B.W 10MHz)	10,740.00	41540	QPSK	-32.88	-36.77	-3.89
LTE B66 (B.W 3MHz)	6,980.00	132322	QPSK	-36.37	-40.24	-3.87

2. Summary of the spot check for Unlicensed EMC

Mod	Test Item	Mod/ Channel	Measured Frequency [MHz]	SM-A725M/DS Result [dBuV/m]		SM-A725F/DS Result [dBuV/m]		Deviation (dB)	
				Average	Peak	Average	Peak	Average	Peak
BT	Band Edge	DH 5 / ch 78	2483.5 MHz~ 2500 MHz	37.20	61.93	39.10	63.83	-1.90	-1.90
	RSE	DH 5 / ch 0	4804 MHz	32.04	56.77	33.32	58.05	-1.28	-1.28
BT LE	Band Edge	2M_37 Bytes / ch 0	2310 MHz~ 2390 MHz	49.06	55.72	49.01	56.09	0.05	-0.37
	RSE	2M_37 Bytes / ch 0	7206 MHz	42.75	49.97	43.60	50.67	-0.85	-0.70
WLAN	DTS BE	802.11g / ch11 / PLS 17	2483.5 MHz	-	65.40	-	65.51	-	-0.11
			# 2483.5 MHz ~ 2484.5 MHz	51.30	-	50.46	-	0.84	-
			2484.5 MHz	51.78	-	49.53	-	2.25	-
	DTS RSE	802.11b / ch11 / PLS 16.5	4924 MHz	48.55	52.56	48.65	52.82	-0.10	-0.26
	UNII BE	802.11n / ch100 / PLS 16	5350 MHz~ 5460 MHz	40.24	61.52	40.25	57.28	-0.01	4.24
			5460 MHz~ 5470 MHz	-	65.96	-	60.45	-	5.51
UNII RSE	802.11a / ch 52 / PLS 16	10520 MHz	-	62.40	-	61.08	-	1.32	
NFC Reader Mode	Fundamental		13.56 MHz	11.41		10.20		1.21	
	RSE		30MHz ~ 1GHz	26.98		26.95		0.03	

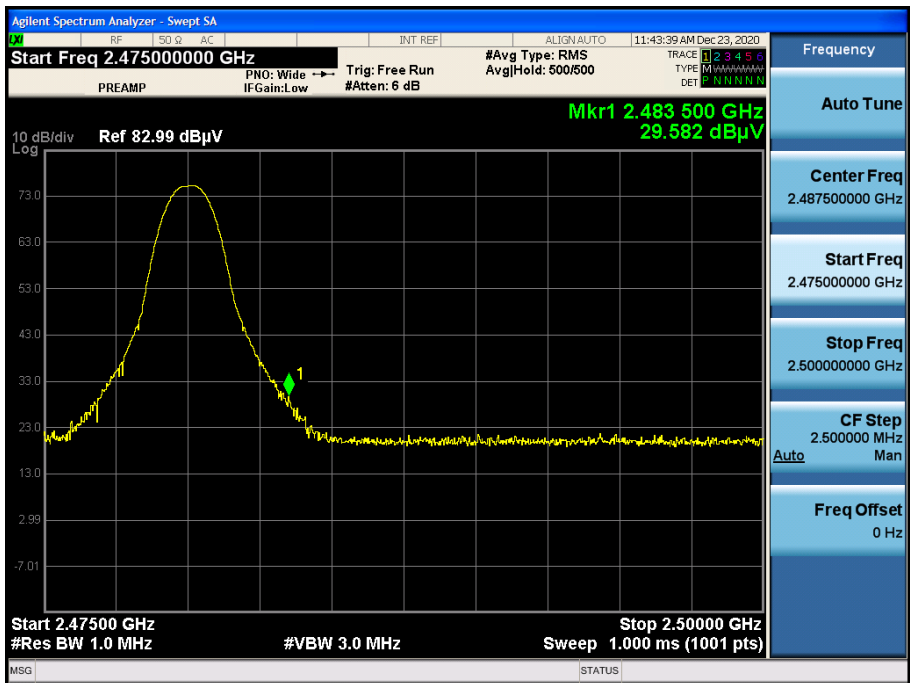
3. Test Plot

BT Band Edge (DH5/ch.78)

Bandedge

Frequency [MHz]	Reading dBuV	※ A.F.+CL [dB]	ANT. POL [H/V]	Duty Cycle Correction [dB]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2483.5	29.582	34.25	H	0	63.83	73.98	10.15	PK
2483.5	29.582	34.25	H	-24.73	39.10	53.98	14.88	AV

[Radiated Restricted Band Edges plot- Peak Reading]

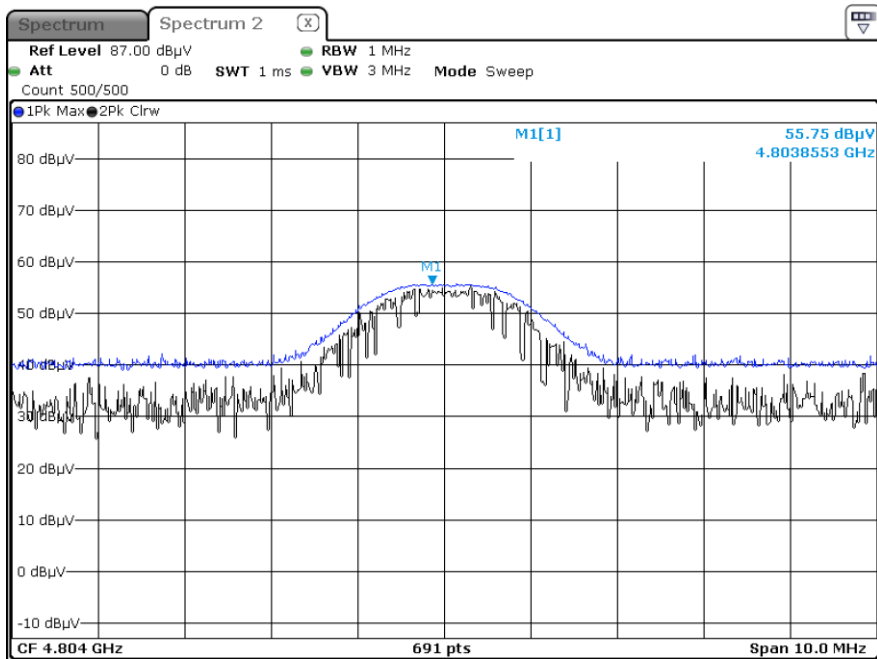


BT R.S.E 2rd Harmonic(DH5/ch.0)

RSE

Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Duty Cycle Correction [dB]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4804	55.75	2.30	H	0	58.05	73.98	15.93	PK
4804	55.75	2.30	H	-24.73	33.32	53.98	20.66	AV

[Radiated Spurious Emissions plot – Peak Reading]



DTS Band Edge (802.11g_6.5 Mbps_ch11)

Bandedge

Frequency [MHz]	Reading dBuV	Duty Cycle Factor	※ A.F.+CL [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2483.5	31.259	0.000	34.25	H	65.51	73.98	8.47	PK
# 2483.5~2484.5	16.100	0.106	34.25	H	50.46	53.98	3.52	AV
2484.5	15.172	0.106	34.25	H	49.53	53.98	4.45	AV

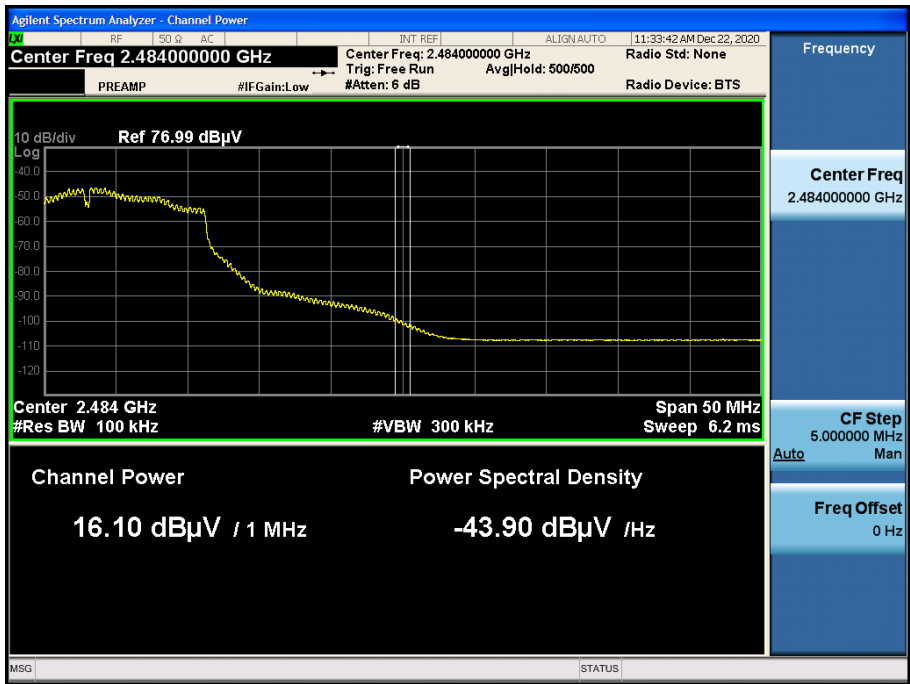
[Radiated Restricted Band Edges plot – Peak Reading]

2 483.5 MHz



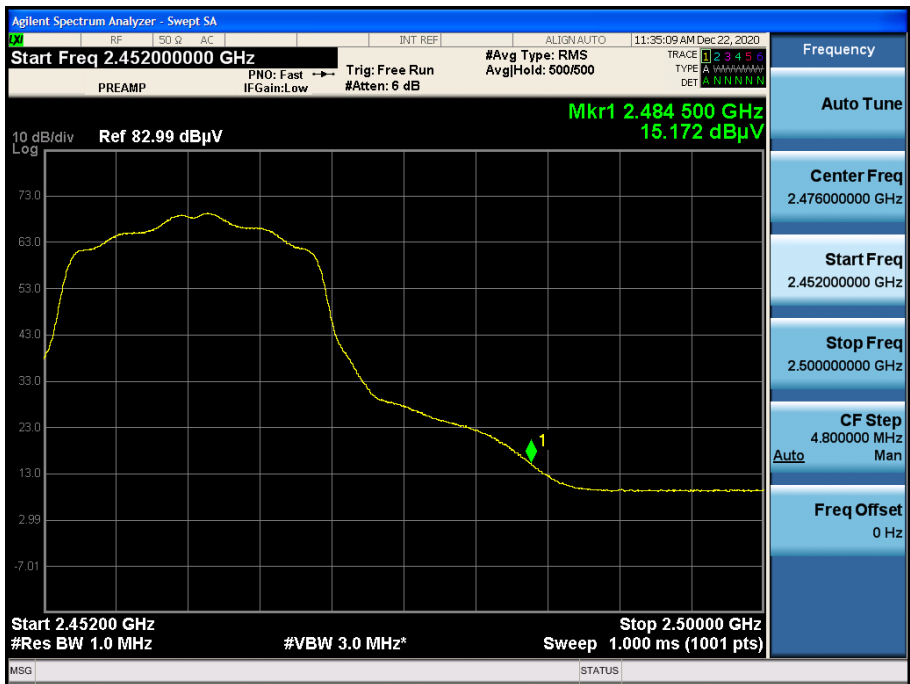
[Radiated Restricted Band Edges plot – Average Reading]

2 483.5 ~ 2 484.5 MHz



[Radiated Restricted Band Edges plot – Average Reading]

2 484.5 MHz

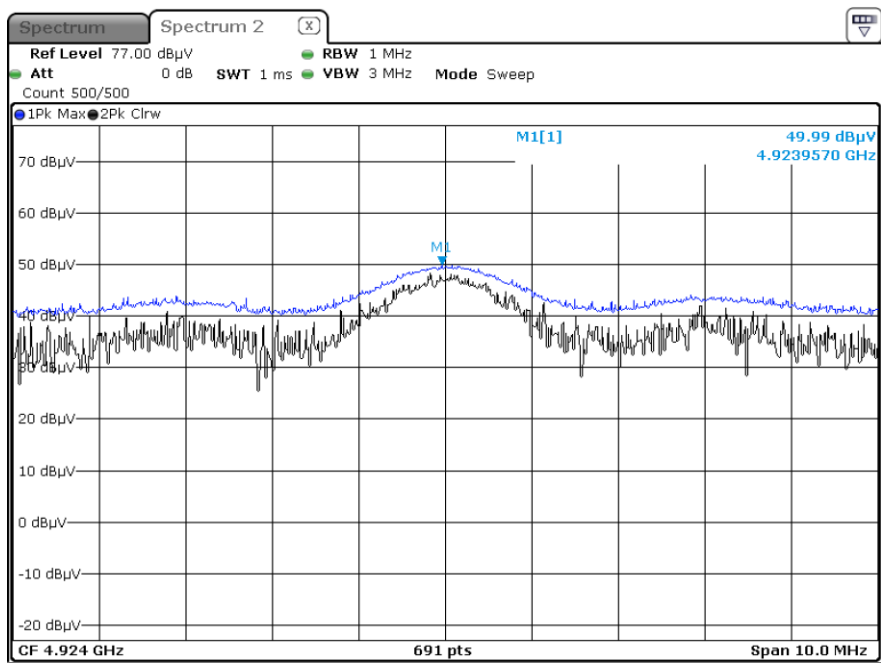


DTS R.S.E 2nd Harmonic (802.11b 1Mbps/ch.11)

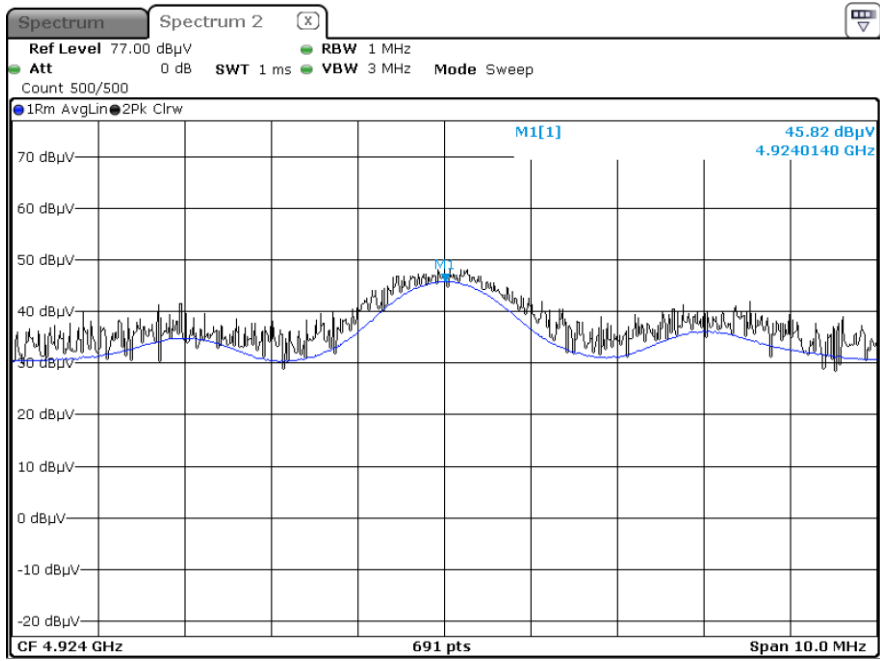
RSE

Frequency [MHz]	Reading [dBuV]	AN.+CL-AMP G [dB]	Pol. [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4924	49.99	2.83	H	52.82	73.98	21.16	PK
4924	45.82	2.83	H	48.65	53.98	5.33	AV

[Radiated Spurious Emissions plot – Peak Reading]



[Radiated Spurious Emissions plot – Average Reading]

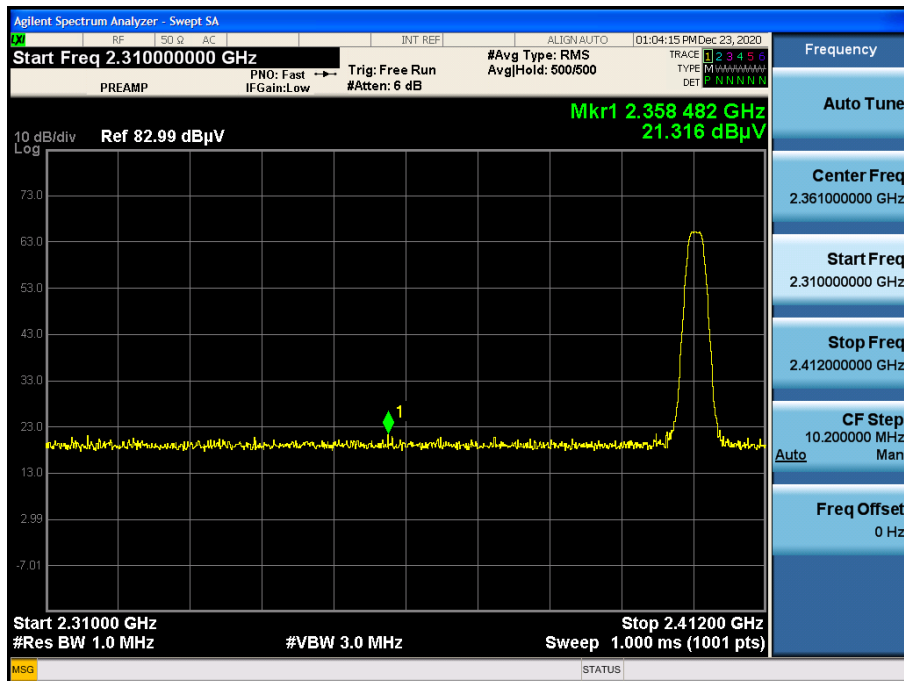


BT(LE) Band Edge (LE(5.0) 2M 37byte/ch.0)

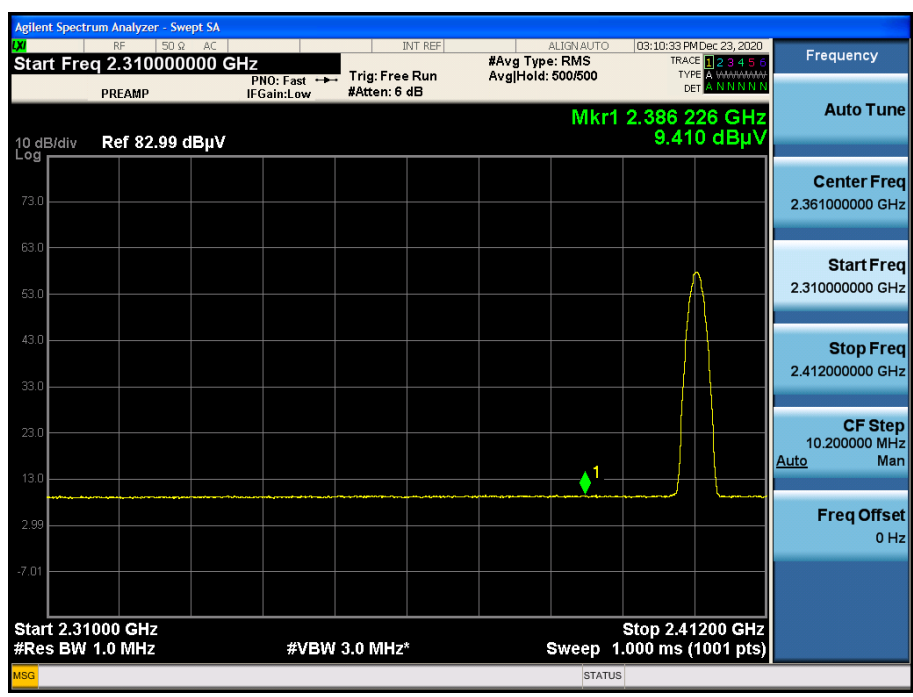
Bandedge

Frequency [MHz]	Reading dBuV	Duty cycle Factor	※ A.F.+CL [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2390.0	21.316	0.00	34.77	H	56.09	73.98	17.89	PK
2390.0	9.410	4.83	34.77	H	49.01	53.98	4.97	AV

[Radiated Restricted Band Edges plot – Peak Reading]



[Radiated Restricted Band Edges plot – Average Reading]

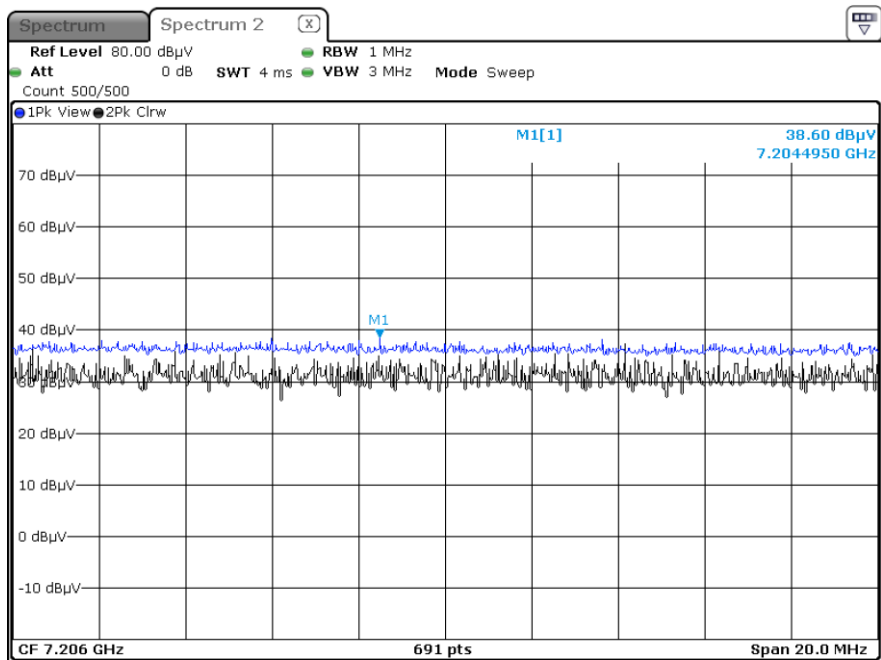


BT(LE) R.S.E 3rd Harmonic (LE(5.0) 2M 37byte/ch.0)

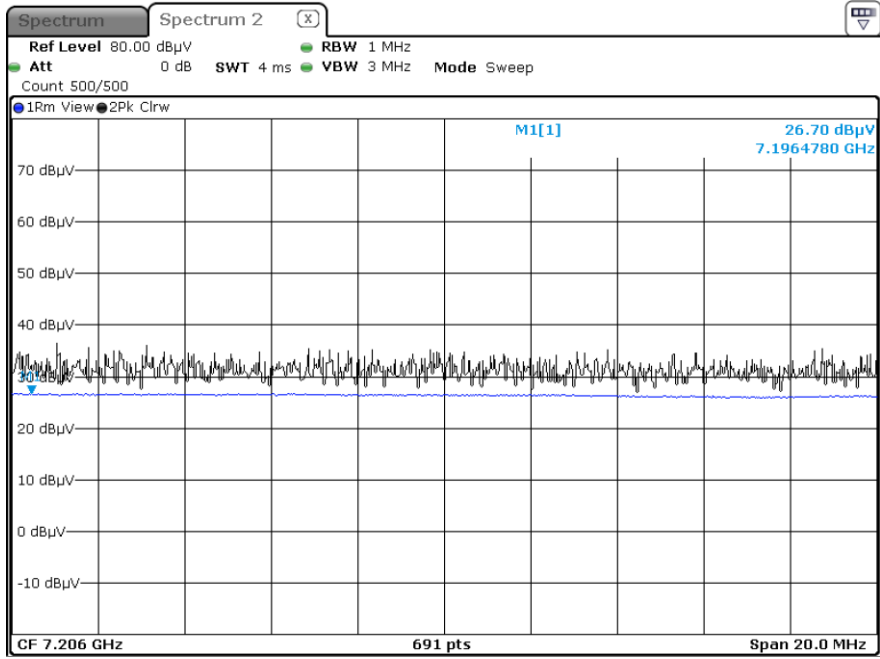
RSE

Frequency [MHz]	Reading dBuV	Duty cycle Factor	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
7206	38.60	0.00	12.07	V	50.67	73.98	23.31	PK
7206	26.70	4.83	12.07	V	43.60	53.98	10.38	AV

[Radiated Spurious Emissions plot – Peak Reading]



[Radiated Spurious Emissions plot – Average Reading]

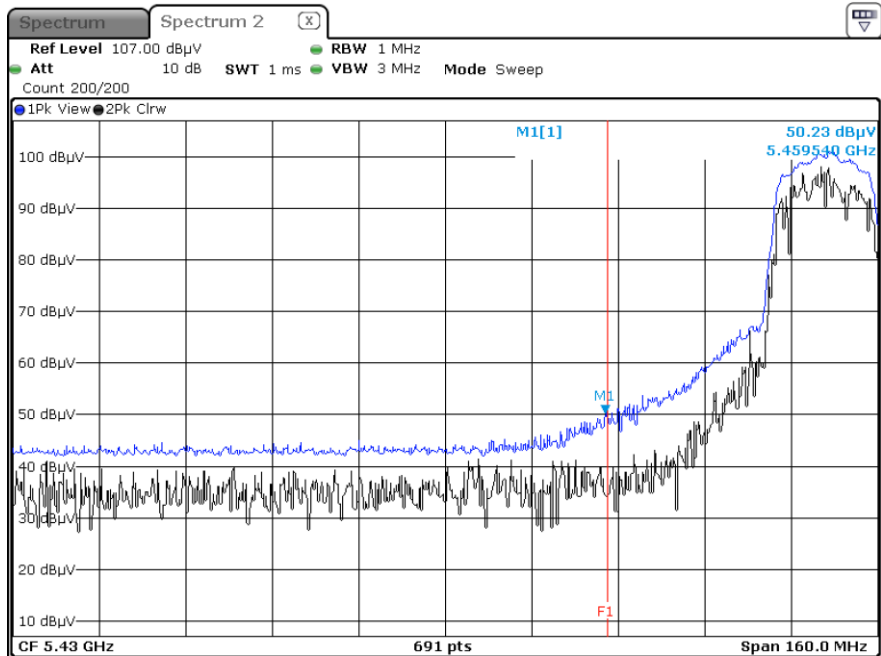


U-NII Band Edge (802.11n_20 MHz BW 6.5 Mbps_ch100)

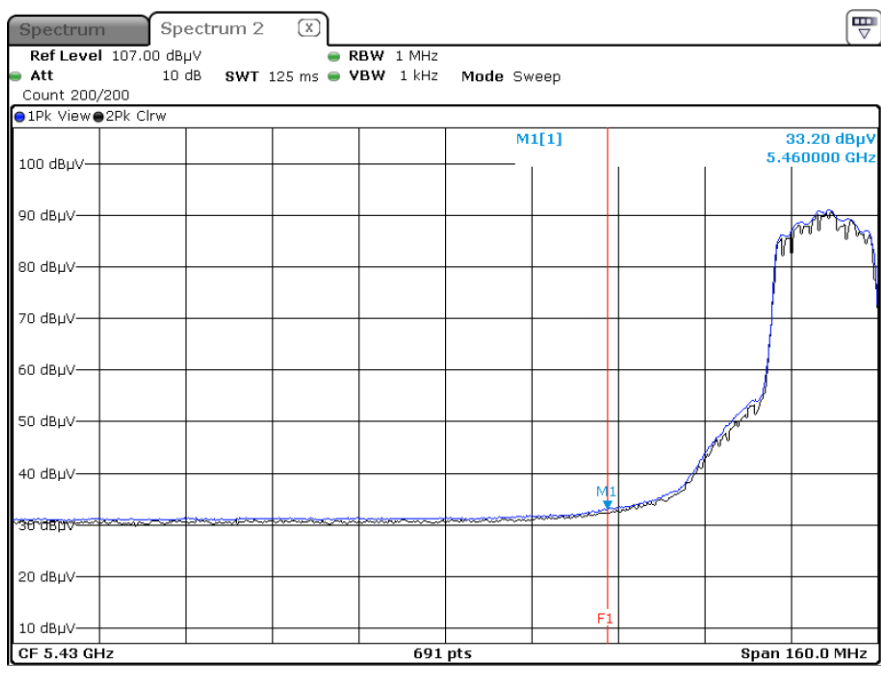
Bandedge

Frequency [MHz]	Reading dBuV	CL+AF+DF-AG [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	50.23	7.05	V	57.28	73.98	16.70	PK
5460	33.20	7.05	V	40.25	53.98	13.73	AV
5470	53.86	6.59	V	60.45	68.20	7.75	PK

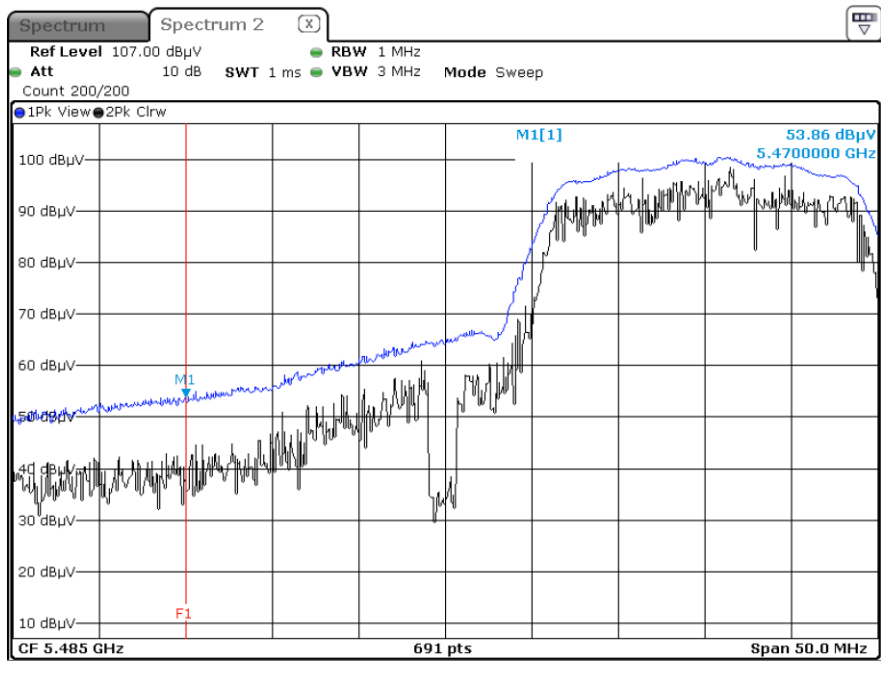
Radiated Restricted Band Edges plot – Peak Reading



Radiated Restricted Band Edges plot – Average Reading



Radiated Restricted Band Edges plot – Peak Reading

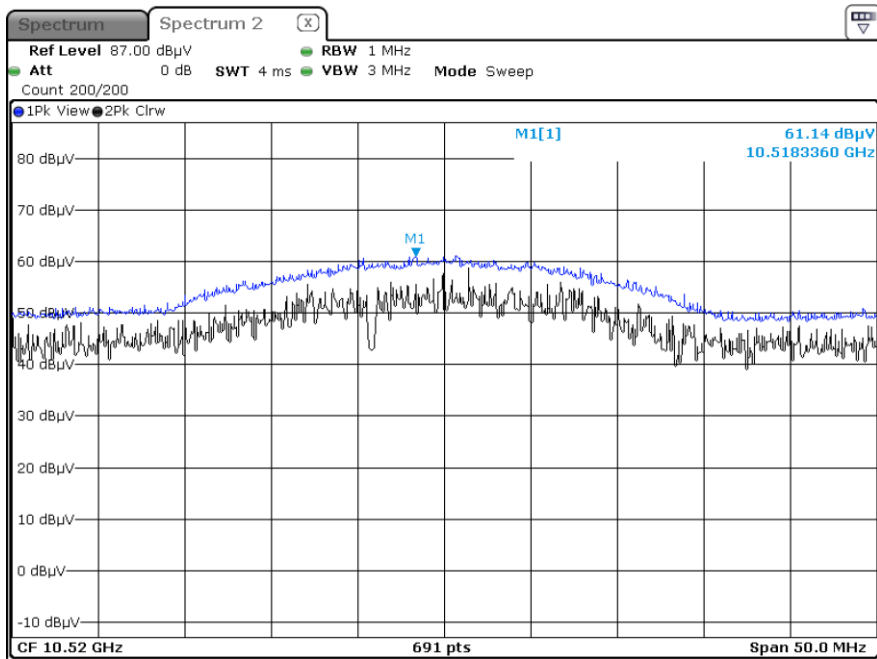


U-NII R.S.E 2nd Harmonic (802.11a_6 Mbps _ ch 52)

RSE

Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10520	61.14	-0.06	V	61.08	68.20	7.12	PK

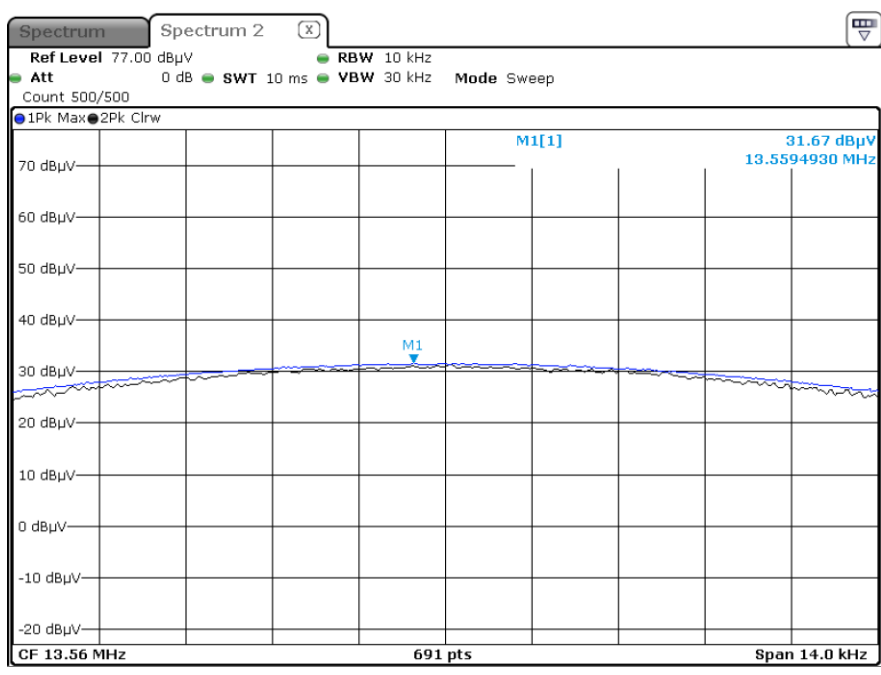
[Radiated Spurious Emissions plot – Peak Reading]



NFC fund

Frequency (MHz)	Read Level (dBuV)@3m	Ant.Factor+Cable Loss (dB/m)	Distance Correction (dB)	Ant. POL	Result Level (dBuV/m)@30m	Limit (dBuV/m)@30m	Margin (dB)
13.5594	31.67	18.53	-40	H	10.20	84.00	73.80

[plot]

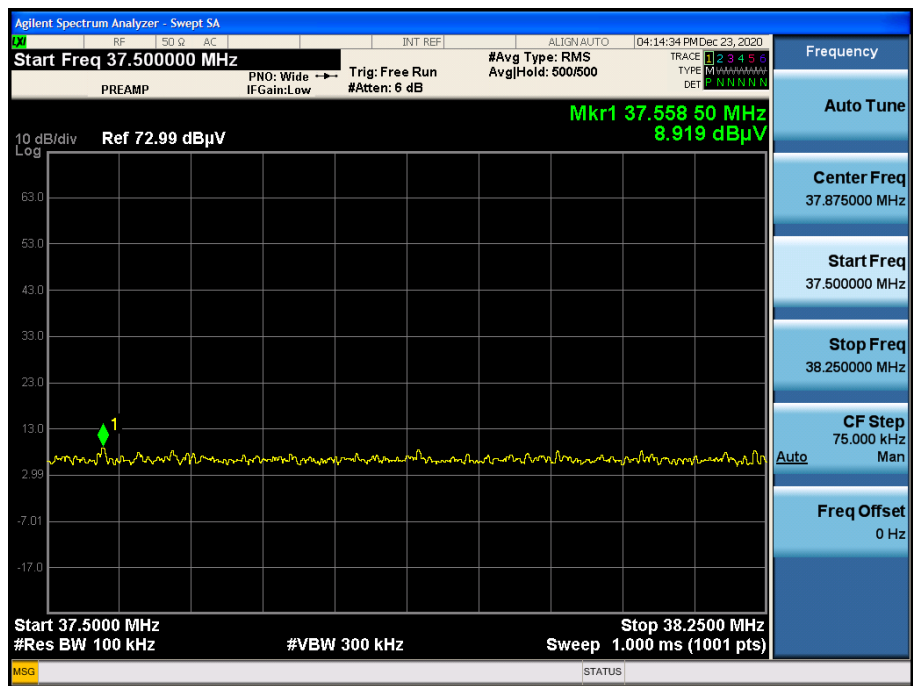


NFC R.S.E Harmonic

RSE

Frequency MHz	Reading dB μ V	Ant. factor dB / m	Cable loss dB	Ant. POL (H/V)	Total dB μ V/m	Limit dB μ V/m	Margin dB
# 37.621	8.919	17.50	0.53	H	26.95	40.00	13.05

[Radiated Spurious Emissions plot]



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
Hewlett Packard	11667B / Power Splitter(DC~26.5 GHz)	11275	04/27/2020	Annual	04/27/2021
Hewlett Packard	E3632A/DC Power Supply	MY40004427	09/16/2020	Annual	09/16/2021
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	93008124	03/18/2020	Annual	03/18/2021
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	02/11/2020	Biennial	02/11/2022
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	10/14/2020	Annual	10/14/2021
Agilent	8960 (E5515C)/ Base Station	MY48360800	08/26/2020	Annual	08/26/2021
Schwarzbeck	FMZB1513/ Loop Antenna(9kHz~30MHz)	1513-175	04/26/2019	Biennial	04/26/2021
Schwarzbeck	VULB9160/ Bilog Antenna	3150	03/12/2019	Biennial	03/12/2021
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	01/22/2020	Annual	01/22/2021
REOHDE & SCHWARZ	SMB100A/ SIGNAL GENERATOR (100kHz~40GHz)	177633	07/13/2020	Annual	07/13/2021
KEYSIGHT	N9030B / Signal Analyzer(5Hz~40.0GHz)	MY55480167	06/04/2020	Annual	06/04/2021
HCT CO., LTD.,	FCC LTE Mobile Conducted RF Automation Test Software	-	-	-	-

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	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	FSV40-N / Spectrum Analyzer	07/28/2020	Annual	102168
Agilent	N9030A / Signal Analyzer	01/13/2020	Annual	MY49431210
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	12/04/2020	Annual	22966
CERNEX	CBL26405040 / Power Amplifier	03/23/2020	Annual	25956
TESCOM	TC-3000C / Bluetooth Tester	03/18/2020	Annual	3000C000276