

EVALUATION REPORT

Applicant Name:

SAMSUNG Electronics Co., Ltd.

Date of Issue:

January 22, 2021

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:**

A3LSMA325F

APPLICANT:

SAMSUNG Electronics Co., Ltd.

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

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 A3LSMA325M
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
A3LSMA325M	PCE	2G, 3G Report	All sections
		LTE B2 Report	All sections
		LTE B5 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
	DXX	NFC Report	All sections



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REVISION HISTORY

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

Revision No.	Date of Issue	Description
0	January 22, 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	-23.18	40.22	-10.25	1.39	H	< 7.00	0.721	28.58
WCDMA850	4132	826.4	-31.38	32.19	-10.24	1.40	H		0.114	20.55
LTE B5	20450	829.0	-31.70	32.01	-10.22	1.40	H		0.109	20.39

Mode	Frequency (MHz)		Mode	SM-A325M/DS (dBm)	SM-A325F/DS (dBm)	Deviation (dB)
	MHz	Ch.				
GSM850	824.2	128	VOICE	28.18	28.58	-0.40
WCDMA850	826.4	4132	RMC	19.73	20.55	-0.82
LTE B5 (B.W 10MHz)	829.0	20450	QPSK	19.69	20.39	-0.70

1.2 EQUIVALENT ISOTROPIC RADIATED POWER

Mode	Ch./ Freq.		Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol.	Limit	EIRP	
	channel	Freq.(MHz)						W	W	dBm
GSM1900	512	1850.2	-14.77	19.31	10.10	2.11	V	< 2.00	0.537	27.30
WCDMA1900	9400	1880.0	-21.38	13.17	10.15	2.15	V		0.131	21.17
LTE B2	18900	1880.0	-21.28	13.27	10.15	2.15	V		0.134	21.27
LTE B41	40620	2593.0	-23.60	13.73	10.98	2.53	H		0.165	22.18

Modulation	Frequency		Mode	SM-A325M/DS (dBm)	SM-A325F/DS (dBm)	Deviation (dB)
	MHz	Ch.				
GSM1900	1850.2	512	VOICE	26.81	27.30	-0.49
WCDMA1900	1880.0	9400	RMC	20.36	21.17	-0.81
LTE B2 (B.W 10MHz)	1880.0	18900	QPSK	21.07	21.27	-0.20
LTE B41 (B.W 20MHz)	2593.0	40620	QPSK	22.88	22.18	0.70

1.3 RADIATED SPURIOUS EMISSIONS

Mode, Channel, (Frequency)	Freq. (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm]	C.L	Pol.	Result (dBm)
GSM850 CH 190 (836.6)	2 509.80	-50.40	10.75	-54.12	2.50	V	-45.87
GSM1900 CH 810 (1909.8)	7 639.20	-56.43	11.65	-45.90	4.47	H	-38.72
WDM850 CH 4183 (836.6)	3 346.40	-59.33	12.48	-60.31	2.92	V	-50.76
WDM1900 CH 9262 (1852.4)	7 409.60	-58.08	11.13	-47.90	4.45	H	-41.22
LTE B2 CH 18650 (1855.0)	7 420.00	-57.16	11.15	-46.62	4.43	H	-39.90
LTE B5 CH 20415 (825.5)	2 476.50	-55.91	10.60	-60.11	2.48	H	-51.99
LTE B41 CH 39675 (2498.5)	7 495.50	-48.58	11.20	-48.77	4.47	V	-42.04



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Modulation	Frequency		Mode	SM-A325M/DS (dBm)	SM-A325F/DS (dBm)	Deviation (dB)
	MHz	Ch.				
GSM850	2 509.80	190	VOICE	-43.63	-45.87	2.24
GSM1900	7 639.20	810	RMC	-38.43	-38.72	0.29
WDM850	3 346.40	4183	RMC	-48.04	-50.76	2.72
WDM1900	7 409.60	9262	RMC	-39.25	-41.22	1.97
LTE B2 (B.W 10MHz)	7 420.00	18650	QPSK	-40.03	-39.90	-0.13
LTE B5 (B.W 3MHz)	2 476.50	20415	QPSK	-51.29	-51.99	0.70
LTE B41 (B.W 5MHz)	7 495.50	39675	QPSK	-37.48	-42.04	4.56

2. Summary of the spot check for Unlicensed EMC

Mod	Test Item	Mod/ Channel	Measured Frequency [MHz]	SM-A325M/DS Result [dBuV/m]		SM-A325F/DS Result [dBuV/m]		Deviation (dB)	
				Average	Peak	Average	Peak	Average	Peak
BT	Band Edge	2DH5 / CH78	2483.5 MHz ~ 2500 MHz	46.74	56.28	46.56	55.95	0.18	0.33
	RSE	DH 5 / ch 0	7206 MHz	46.82	54.70	45.65	53.73	1.17	0.97
BT LE	Band Edge	2M_37 Bytes / ch 39	2483.5 MHz ~ 2500 MHz	49.76	55.85	49.59	56.39	0.17	-0.54
	RSE	2M_37 Bytes / ch 19	7320 MHz	45.07	53.56	45.35	53.03	-0.28	0.53
WLAN	DTS BE	802.11g / CH11 / PLS 16	2483.5 MHz ~ 2500 MHz	51.69	71.03	51.33	70.88	0.36	0.15
	DTS RSE	802.11b / CH6 / PLS 17	4874 MHz	50.90	53.99	50.63	54.29	0.27	-0.30
	UNII BE	802.11a / CH64 / PLS 16	5350 MHz ~ 5460 MHz	48.82	70.53	48.81	69.01	0.01	1.52
	UNII RSE	802.11a / CH120 / PLS 16	11200 MHz	47.46	60.13	48.64	61.57	-1.18	-1.44
NFC Reader Mode	Fundmental		13.56 MHz	13.20		12.71		0.49	
	RSE		30MHz ~ 1GHz	26.63		26.57		0.06	

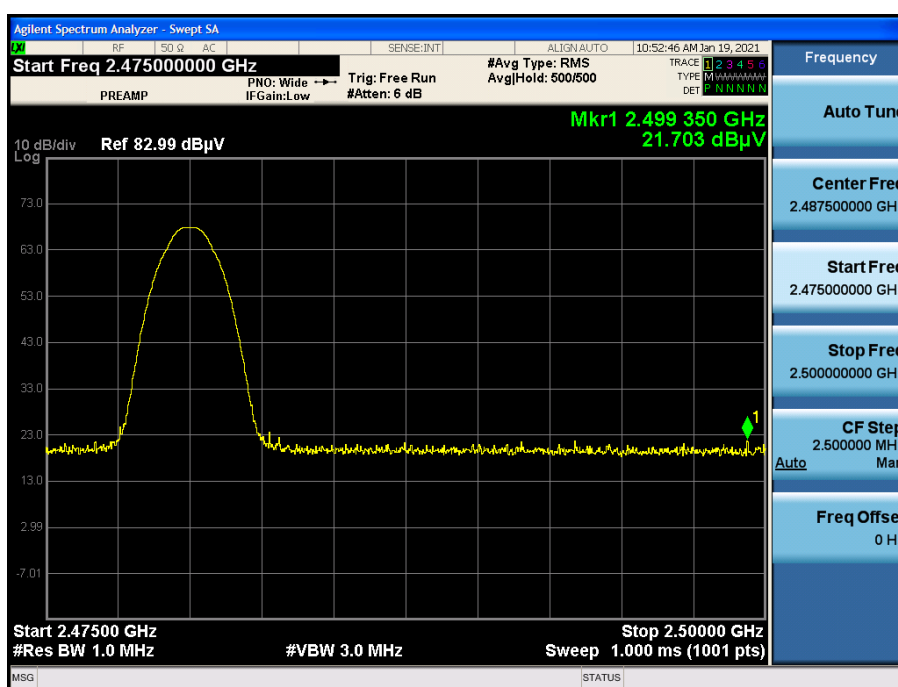
3. Test Plot

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

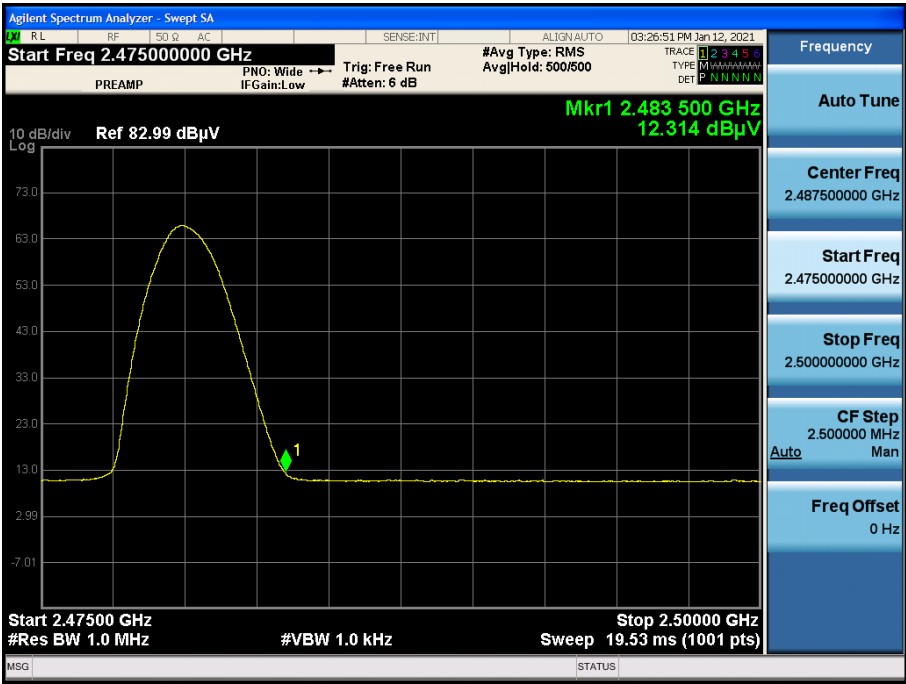
Bandedge

Frequency [MHz]	Reading dBuV	※ A.F.+CL [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2483.5	21.70	34.25	V	55.95	73.98	18.03	PK
2483.5	12.31	34.25	V	46.56	53.98	7.42	AV

[Radiated Restricted Band Edges plot- Peak Reading]



[Radiated Restricted Band Edges plot- Average Reading]

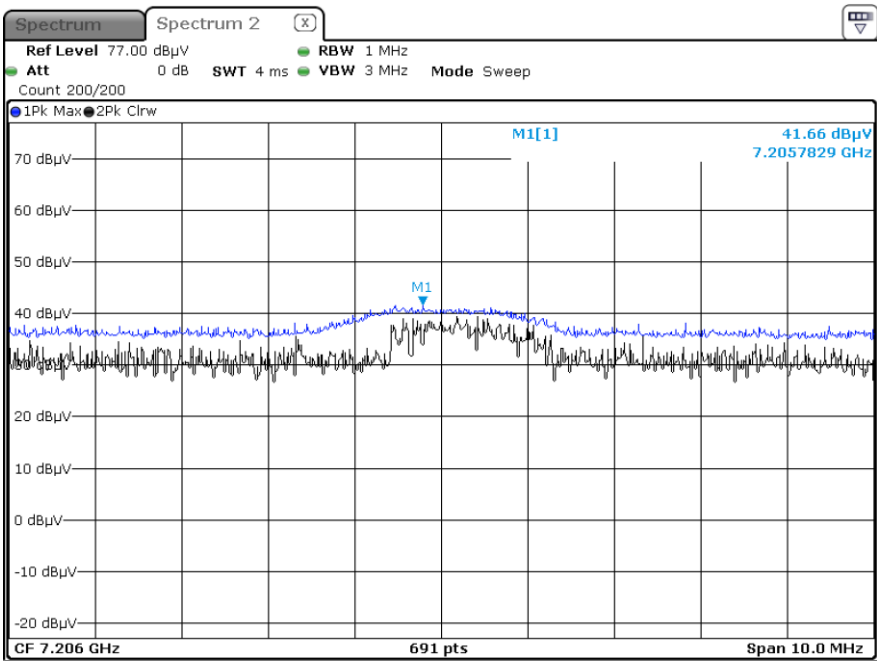


BT R.S.E 3rd Harmonic(DH5/ch.0)

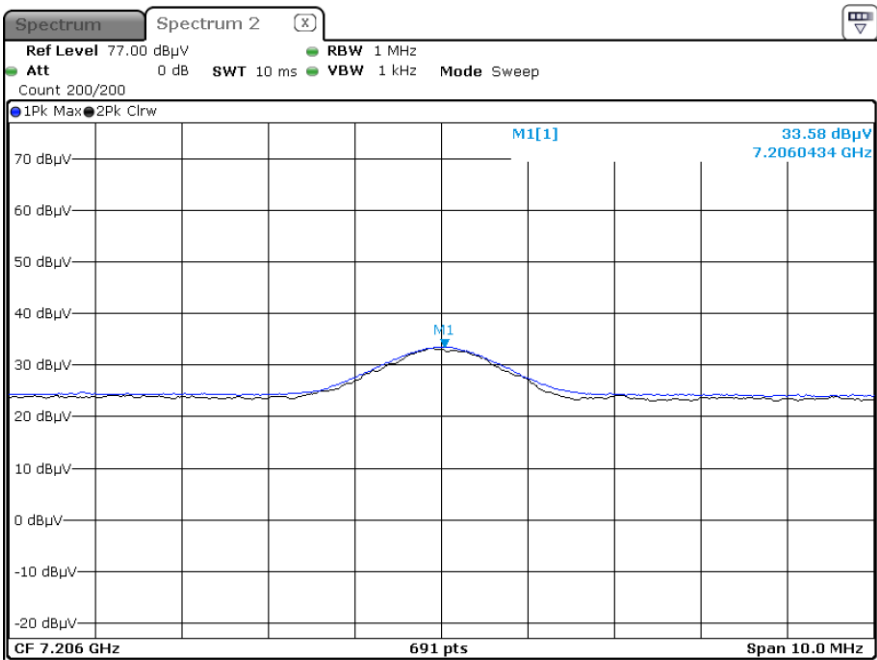
RSE

Frequency [MHz]	Reading dBuV	A.F+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
7206	41.66	12.07	H	53.73	73.98	20.25	PK
7206	33.58	12.07	H	45.65	53.98	8.33	AV

[Radiated Spurious Emissions plot – Peak Reading]



[Radiated Spurious Emissions plot – Average Reading]

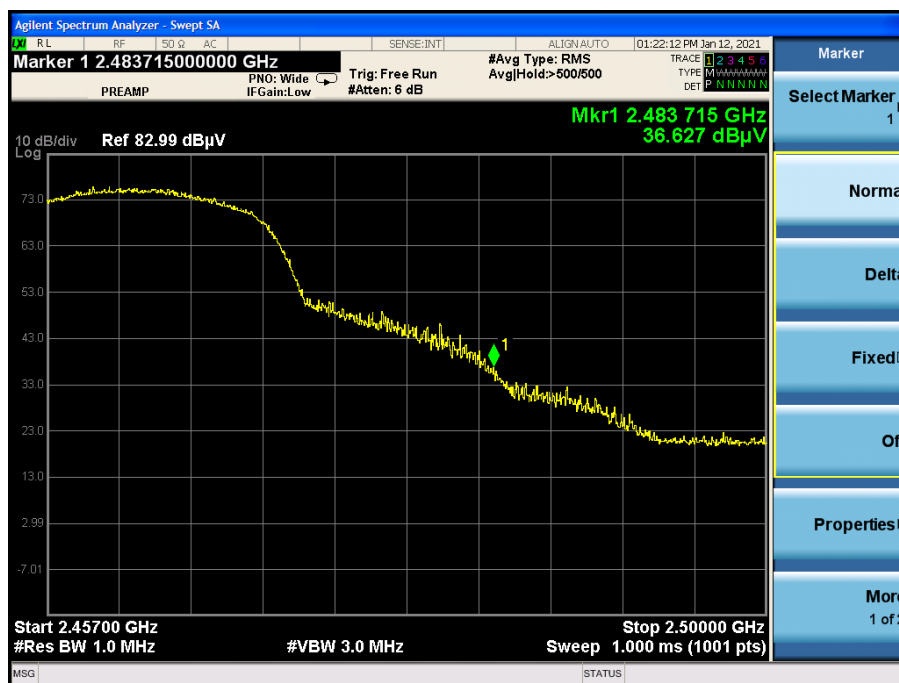


DTS Band Edge (802.11g_6 Mbps/ch11)

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	36.63	0.00	34.25	H	70.88	73.98	3.10	PK
2483.5	16.92	0.16	34.25	H	51.33	53.98	2.65	AV

[Radiated Restricted Band Edges plot – Peak Reading]



[Radiated Restricted Band Edges plot – Average Reading]

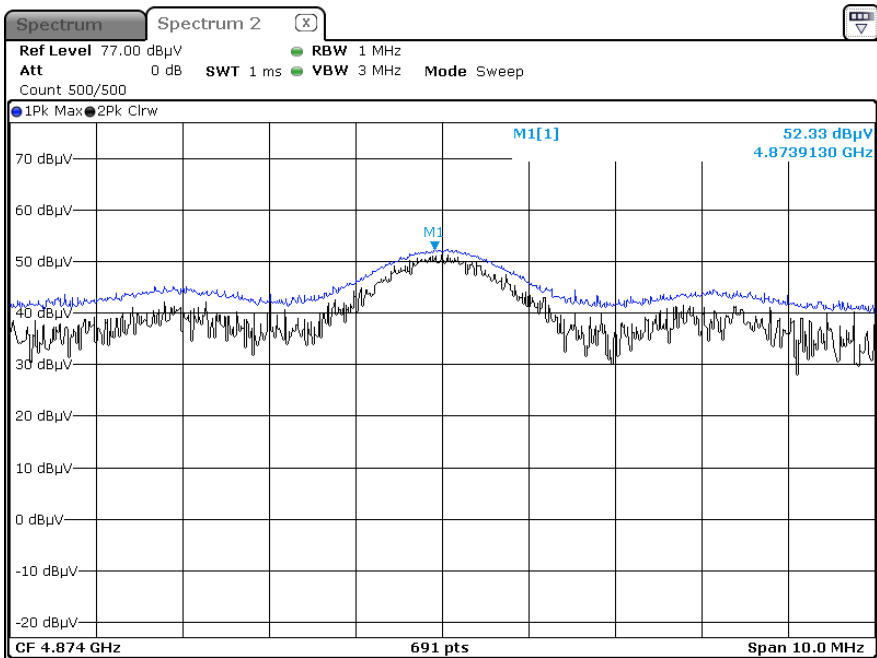


DTS R.S.E 2nd Harmonic (802.11b_1Mbps/ch.6)

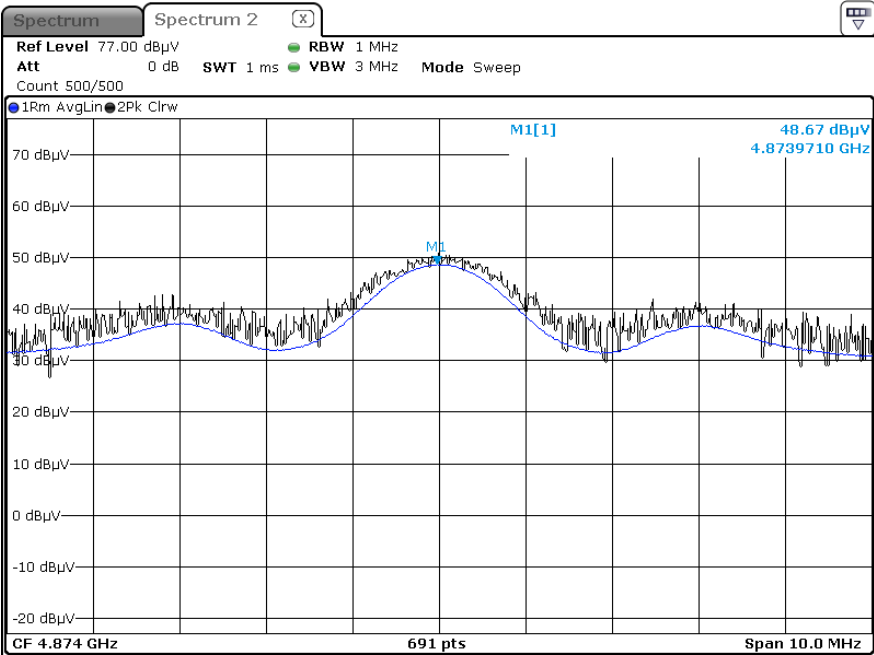
RSE

Frequency [MHz]	Reading [dBuV]	A.F+CL-AMP G [dB]	Pol. [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4874	52.33	1.96	H	54.29	73.98	19.69	PK
4874	48.67	1.96	H	50.63	53.98	3.35	AV

[Radiated Spurious Emissions plot – Peak Reading]



[Radiated Spurious Emissions plot – Average Reading]

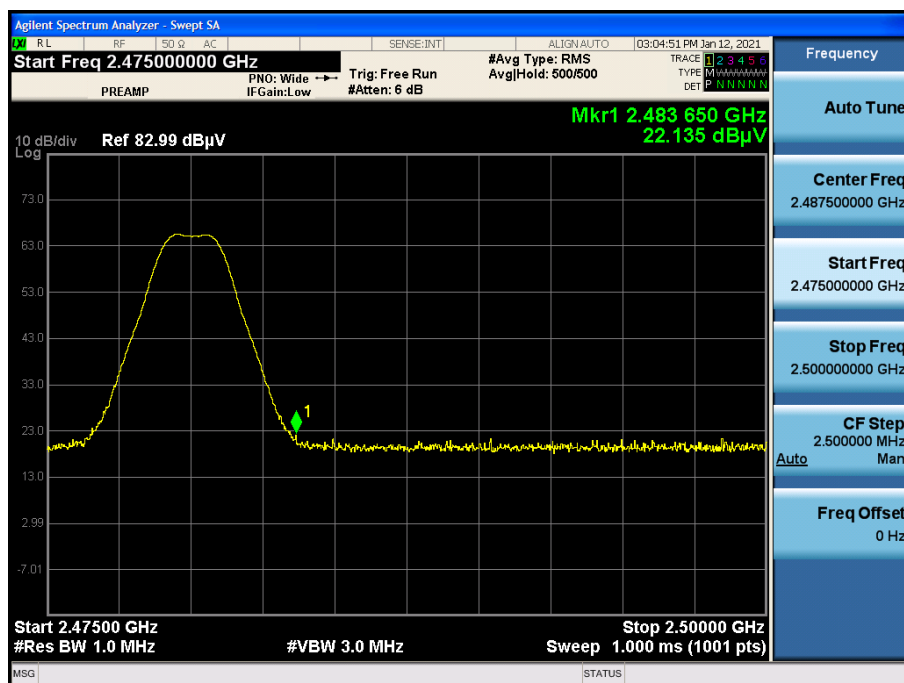


BT(LE) Band Edge (LE(5.0) 2M 37byte/ch.39)

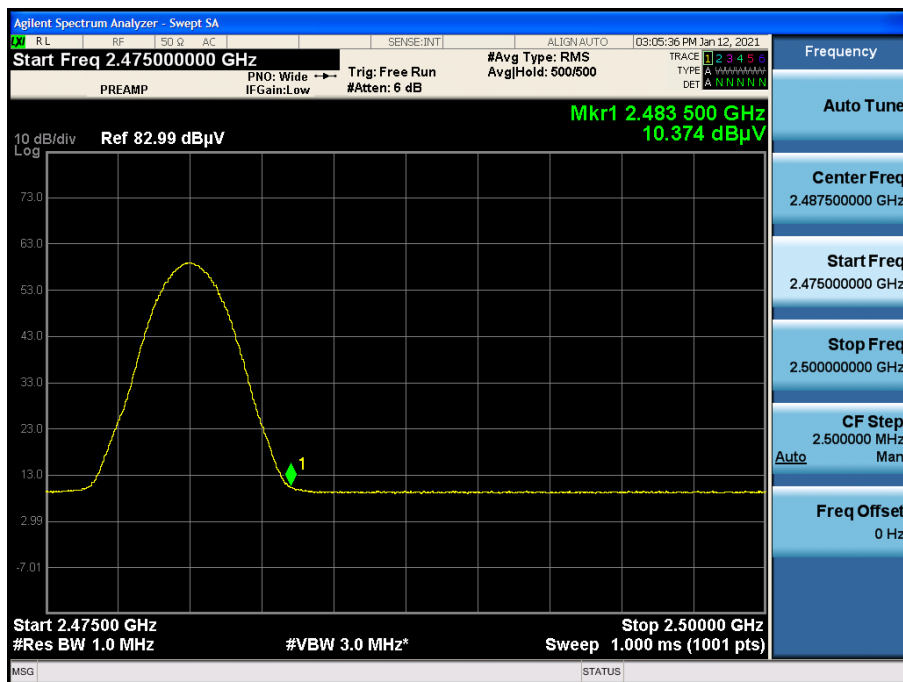
Bandedge

Frequency [MHz]	Reading dBuV	Duty cycle Factor	※ A.F.+CL [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2483.5	22.14	0.00	34.25	H	56.39	73.98	17.60	PK
2483.5	10.37	4.97	34.25	H	49.59	53.98	4.39	AV

[Radiated Restricted Band Edges plot – Peak Reading]

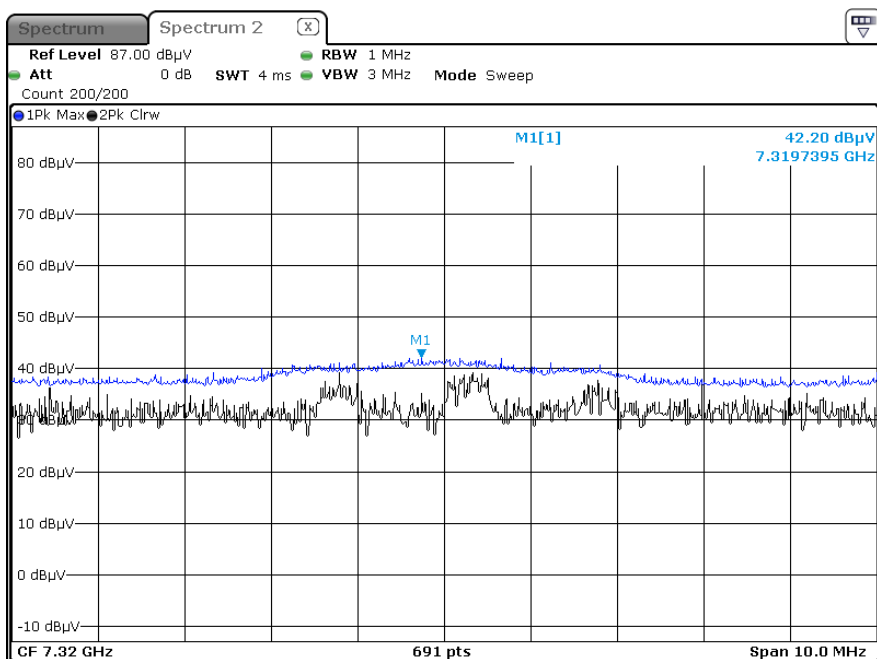


[Radiated Restricted Band Edges plot – Average Reading]

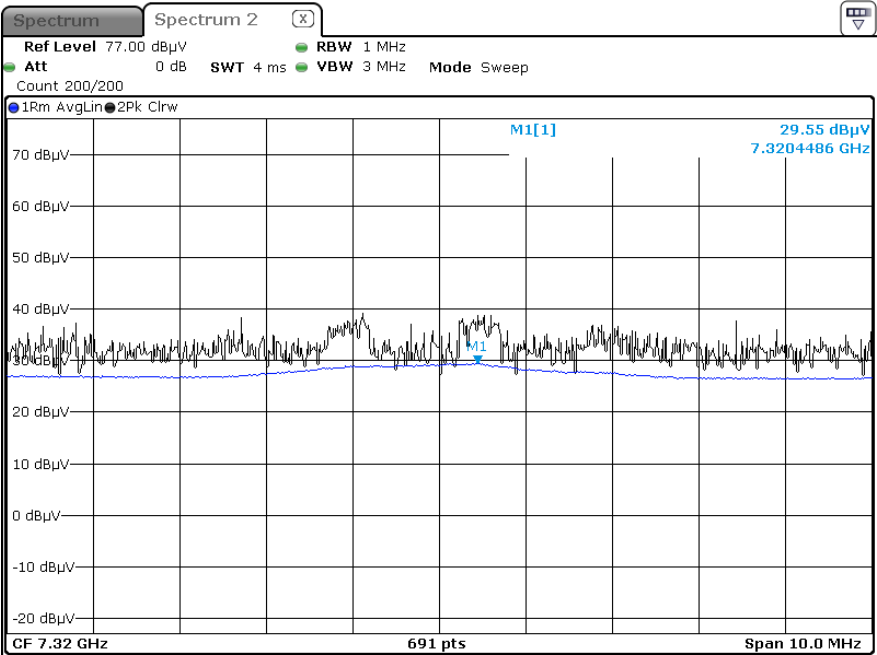


BT(LE) R.S.E 3rd Harmonic (LE(5.0) 2M 37byte/ch.19)**RSE**

Frequency [MHz]	Reading dBuV	Duty cycle Factor	A.F+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
7320	42.20	0.00	10.83	V	53.03	73.98	20.95	PK
7320	29.55	4.97	10.83	V	45.35	53.98	8.63	AV

[Radiated Spurious Emissions plot – Peak Reading]

[Radiated Spurious Emissions plot – Average Reading]

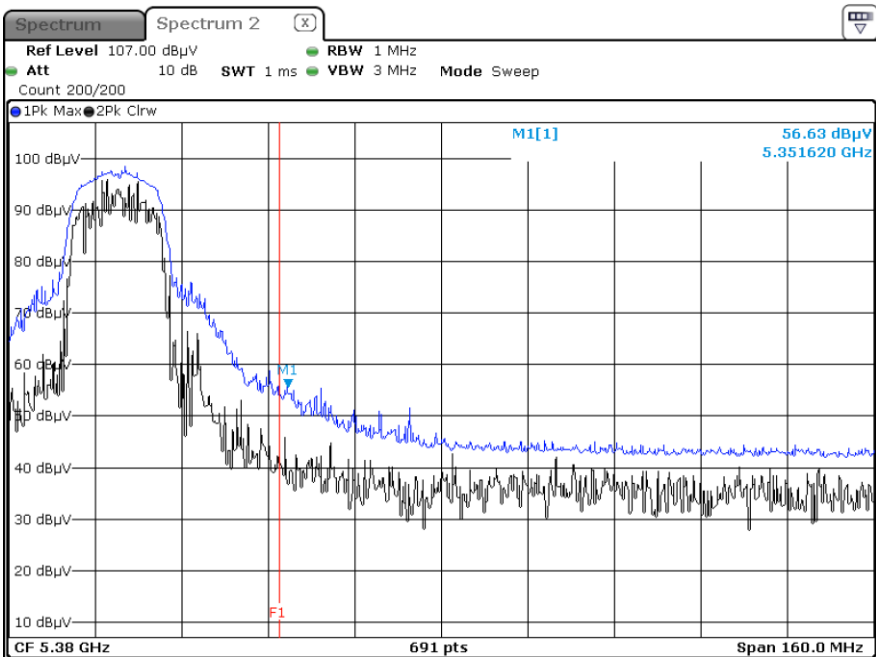


U-NII Band Edge (802.11a_6 Mbps/ch64)

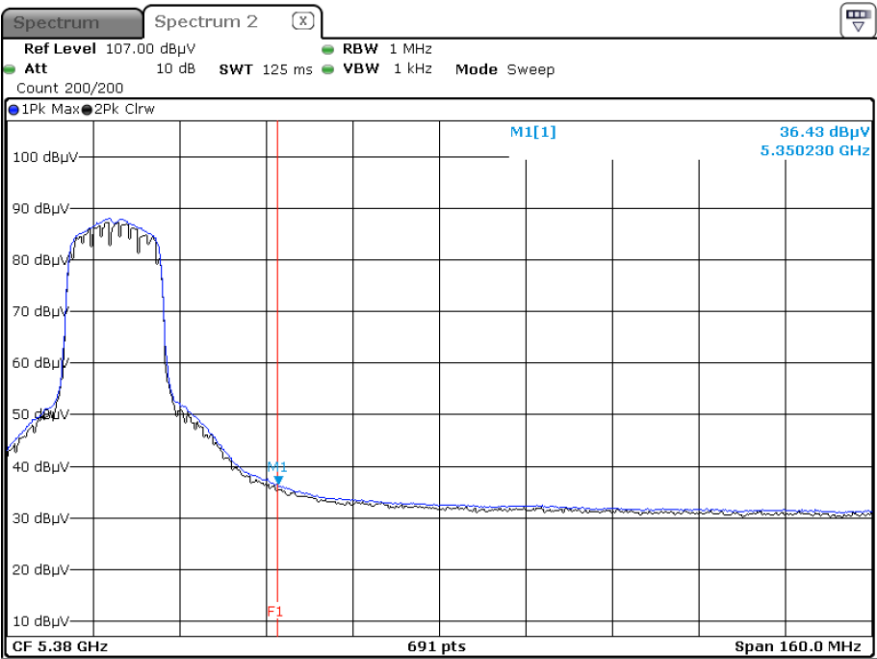
Bandedge

Frequency [MHz]	Reading dBuV	CL+AF+DF-AG+ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5350	56.63	12.38	H	69.01	73.98	4.97	PK
5350	36.43	12.38	H	48.81	53.98	5.17	AV

[Radiated Restricted Band Edges plot – Peak Reading]



[Radiated Restricted Band Edges plot – Average Reading]

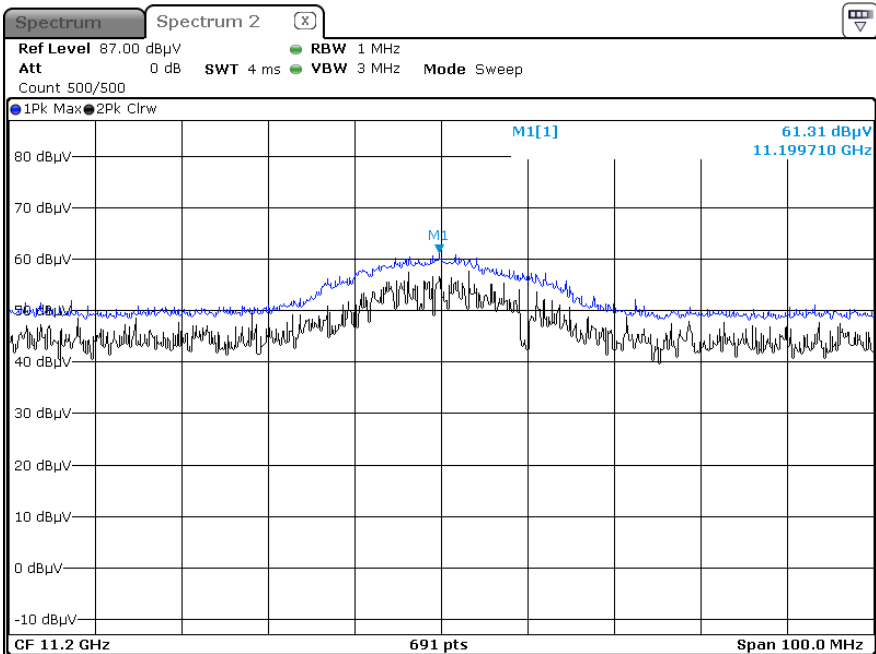


U-NII R.S.E 2nd Harmonic (802.11a_6 Mbps/ch.120)

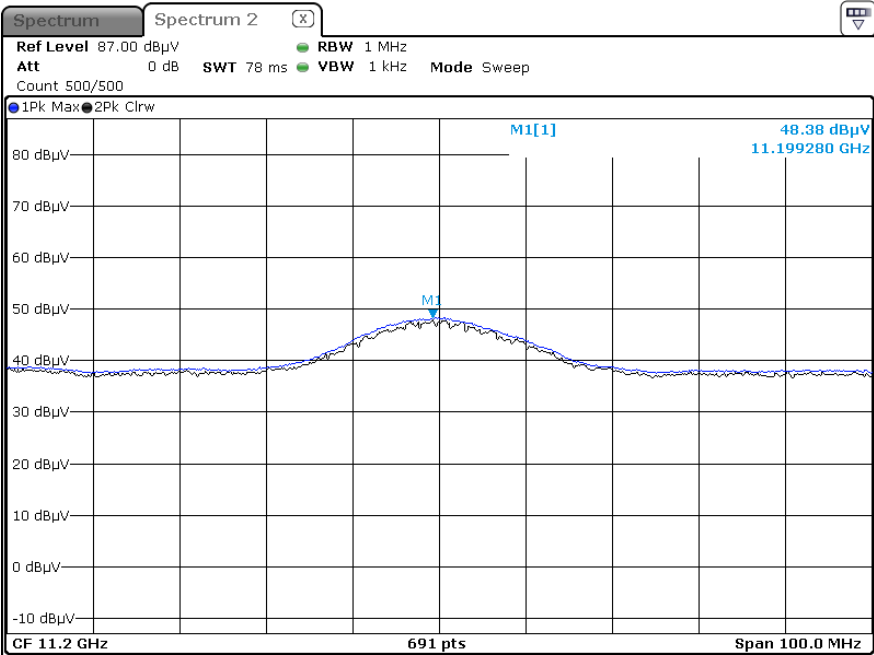
RSE

Frequency [MHz]	Reading dBuV	A.F+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11200	61.31	0.26	H	61.57	73.98	12.41	PK
11200	48.38	0.26	H	48.64	53.98	5.34	AV

[Radiated Spurious Emissions plot – Peak Reading]



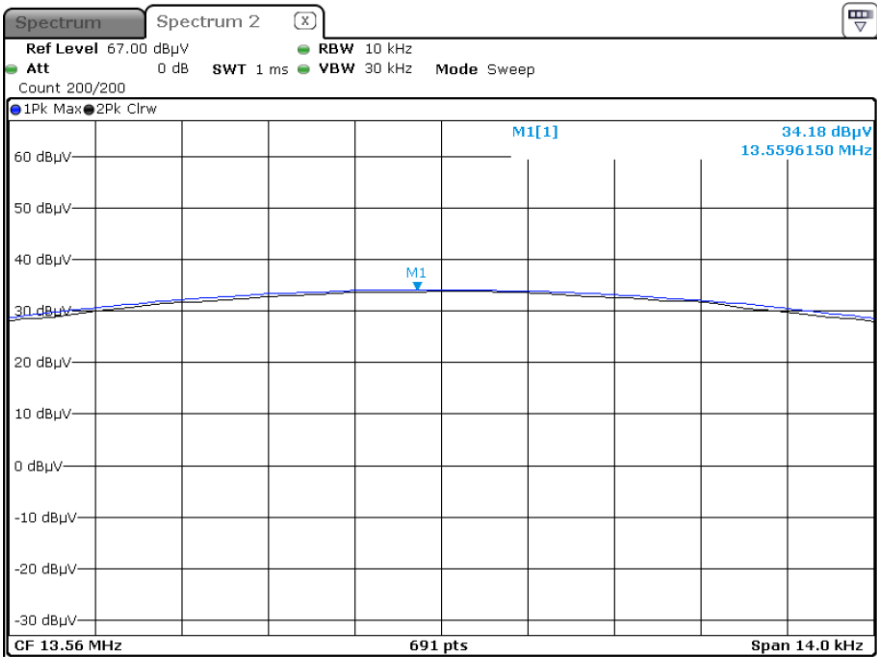
[Radiated Spurious Emissions plot – Average Reading]



NFC fundamental

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)
13.5596	34.18	18.53	-40	H	12.71	84.00	71.29

[plot]

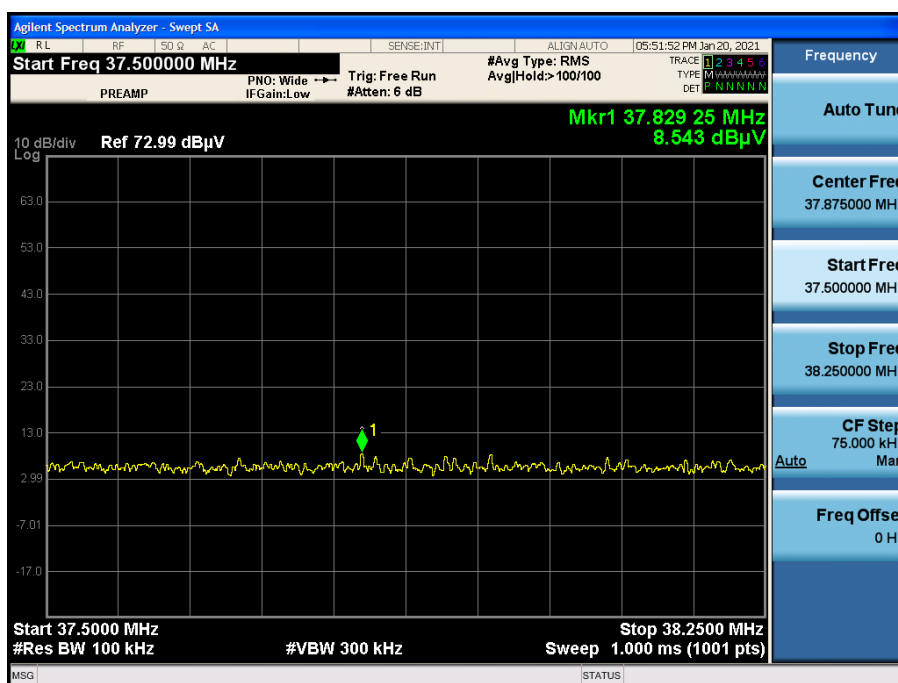


NFC R.S.E Harmonic

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
# 37.8954	8.543	17.50	0.53	H	26.57	40.00	13.43

[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	01/07/2021	Annual	01/07/2022
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	01/11/2021	Annual	MY49431210
Wainwright Instruments	WRCJV2400/2483.5-2370/2520-60/12SS / Band Reject Filter	01/06/2021	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