CERTIFICATION TEST REPORT

Report Number. : 4789867826-E6V1

Applicant : SAMSUNG ELECTRONICS CO., LTD.
129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI,
GYEONGGI-DO, 16677, KOREA

Model : SM-T738U

FCC ID : A3LSMT738U

EUT Description : WCDMA/LTE/5G NR Tablet + BT/BLE, DTS/UNII a/b/g/n/ac

Test Standard(s) : FCC 47 CFR PART 15 SUBPART C

Date Of Issue:
2021-05-25

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IAS ACCREDITED
TL-637

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	2021-05-25	Initial issue	Hyunsik Yun

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	SAMSUNG ELECTRONICS CO., LTD.
EUT DESCRIPTION:	WCDMA/LTE/5G NR Tablet + BT/BLE, DTS/UNII a/b/g/n/ac
MODEL NUMBER:	SM-T738U
SERIAL NUMBER:	R32R2009HKX (Conducted, Original); R32R2009QPH, R32R2009K5M (Radiated, Original); R32R4004Q0Y, R32R4004P8K (Radiated, Spot-check);
DATE TESTED:	2021-03-16 – 2021-04-14(Original); 2021-04-26 ~ 2021-04-27(Spot-check);

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	Complies

UL Korea, Ltd. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Korea, Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Korea, Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Korea, Ltd. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by IAS, any agency of the Federal Government, or any agency of any government.

Approved & Released For
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Junwhan Lee
Suwon Lab Engineer
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Tested By:

Hyunsik Yun
Suwon Lab Engineer
UL Korea, Ltd.

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1.1. INTRODUCTION OF TEST DATA REUSE

This report referenced from the FCC ID: A3LSMT736B BLE(FCC CFR 47 Part 15C).
And the applicant takes full responsibility that the test data as referenced in this report represent compliance for this FCC ID.

1.2. DIFFERENCE

The FCC ID: A3LSMT738U shares the same enclosure and circuit board as FCC ID: A3LSMT736B. The BLE antennas and surrounding circuitry and layout are identical between these two units for re-used bands.

In SM-T738U model, PCB is commonly used for both models, some RF parts are different because of the difference in supported bands between EU and US.
Some components related mmWave were added.

After confirming through preliminary radiated emissions that the performance of the FCC ID: A3LSMT736B remains representative of FCC ID: A3LSMT738U. The test data of FCC ID: A3LSMT736B being submitted for this application to cover BLE features.

1.3. SPOT CHECK VERIFICATION DATA

Band	Test Item	Simbol rate	Frequency	Test Limit	Original model	Spot check model	Deviation	Remark
					SM-T736B	SM-T738U		
					FCC ID : A3LSMT736B	FCC ID : A3LSMT738U		
DTS BLE	Band Edge	500kbps 2480	2480 MHz	54 dBuV/m	43.02 dBuV/m	43.01 dBuV/m	-0.01 dB	
	RSE	500kbps 2480	7440 MHz	54 dBuV/m	45.70 dBuV/m	37.17 dBuV/m	-8.53 dB	
	Band Edge	2M 2480	2480 MHz	54 dBuV/m	42.94 dBuV/m	40.57 dBuV/m	-2.37 dB	
	RSE	2M 2480	7440 MHz	54 dBuV/m	42.96 dBuV/m	37.40 dBuV/m	-5.56 dB	

Comparison of two models, upper deviation is within 3dB range and all test results are under FCC technical limits.

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1.4. REFERENCE DETAIL

Reference application that contains the re-used reference data.

Equipment Class	Reference FCC ID	Application Type	Reference Test report	Reuse (EMC/RFX)	Report Title / Section
DTS	A3LSMT736B	Original Grant	4789841420-E3	EMC	Report DTS[b,g,n] WLAN/ All sections
			4789841420-E4	EMC	FCC Report BLE/ All sections
DSS	A3LSMT736B	Original Grant	4789841420-E5	EMC	FCC Report BT/ All sections
NII	A3LSMT736B	Original Grant	4789841420-E6	EMC	FCC Report UNII[a,n,ac] WLAN/ All sections

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2. TEST METHODOLOGY

1. FCC CFR 47 Part 2.
2. FCC CFR 47 Part 15.
3. KDB 558074 D01 15.247 Meas Guidance v05r02.
4. ANSI C63.10-2013.
5. KDB 484596 D01 Referencing Test Data v01

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea. Line conducted emissions are measured only at the 218 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

218 Maeyeong-ro
☒ Chamber 1
☒ Chamber 2
☐ Chamber 3

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4. DECISION RULES AND MEASUREMENT UNCERTAINTY

4.1. METROLOGICAL TRACEABILITY

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

28.9 dBuV/m = 36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB

4.3. DECISION RULES

Decision rule for statement(s) of conformity is based on Procedure 1, Clause 4.4.2 in IEC Guide 115:2007.

4.4. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.01 dB
Radiated Disturbance, 30 MHz to 1 GHz	4.26 dB
Radiated Disturbance, 1 GHz to 18 GHz	5.90 dB
Radiated Disturbance, 18 GHz to 40 GHz	5.49 dB

Uncertainty figures are valid to a confidence level of 95%.

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5. EQUIPMENT UNDER TEST

5.1. EUT DESCRIPTION

The EUT is a WCDMA/LTE/5G NR Tablet + BT/BLE, DTS/UNII a/b/g/n/ac.
This test report addresses the DTS (BLE) operational mode.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power as follows:

Frequency Range [MHz]	Mode	Power Mode	Output Power [dBm]	Output Power [mW]
2 402 ~ 2 480	500kbps	Peak	7.977	6.276
		Average	7.616	5.776
	2Mbps	Peak	8.060	6.397
		Average	7.359	5.444

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

The internal antenna was Permanently attached.
Therefore this E.U.T Complies with the requirement of §15.203.

The radio utilizes an internal antennas, with maximum gain of -1.71 dBi.

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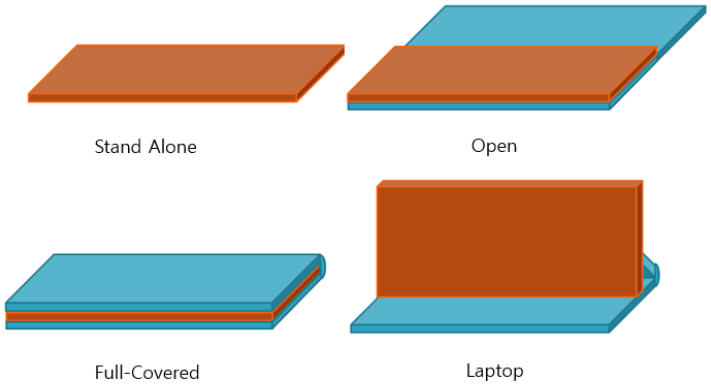
5.4. WORST-CASE CONFIGURATION AND MODE

Radiated emission below 1GHz and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

Radiated emission above 1GHz was performed with the EUT set to transmit low/mid/high channels.

The fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z it was determined that X orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Stand Alone X orientation.

i. Foldable Condition
The Fundamental of the EUT was investigated in four foldable conditions(Stand Alone, , Open, Full-Coverd, Laptop).



Note : All radiated and power line conducted tests were performed attached with travel adapter and earphone for the worst case condition mode.

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Power verification

The Output Power of all data rate are all investigated, the 500 kbps(37 pkt) and 2 Mbps(255 pkt) power is the worst case for symbol rate. All tests were performed in these two modes.

Symbol Rate [Ms/s]	Mode	Frequency [MHz]	Conducted Burst Avg [dBm]	Symbol Rate [Ms/s]	Mode	Frequency [MHz]	Conducted Burst Avg [dBm]
1	1Mbps (37 pkt)	2402	6.612	2	2Mbps (37 pkt)	2402	6.468
		2440	7.500			2440	7.298
		2480	7.290			2480	7.104
	1Mbps (255 pkt)	2402	6.683		**2Mbps (255 pkt)**	2402	6.479
		2440	7.560			**2440**	**7.359**
		2480	7.243			2480	7.081
1	125 kbps (37 pkt)	2402	6.716				
		2440	7.592				
		2480	7.275				
	125 kbps (255 pkt)	2402	6.645				
		2440	7.208				
		2480	6.966				
	500 kbps (37 pkt)	2402	6.731				
		2440	**7.616**				
		2480	7.327				
	500 kbps (255 pkt)	2402	6.707				
		2440	7.579				
		2480	7.245				

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5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Charger	SAMSUNG	EP-TA200	R37R1XS0P35DK3	N/A
Data Cable	SAMSUNG	EP-DT725BBE	N/A	N/A

I/O CABLE

I/O Cable List						
Cable No.	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	DC Power	1	C Type	Shielded	1.0 m	N/A

TEST SETUP

The EUT is a stand-alone unit during the tests.
Test software in hidden menu exercised the EUT to enable BLE mode.

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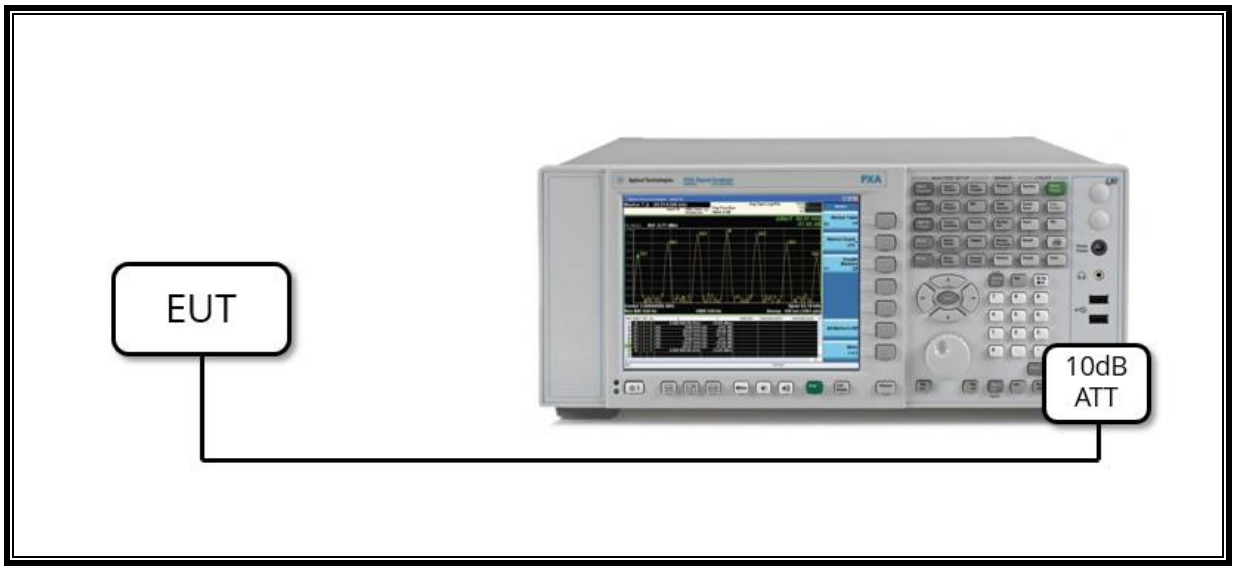
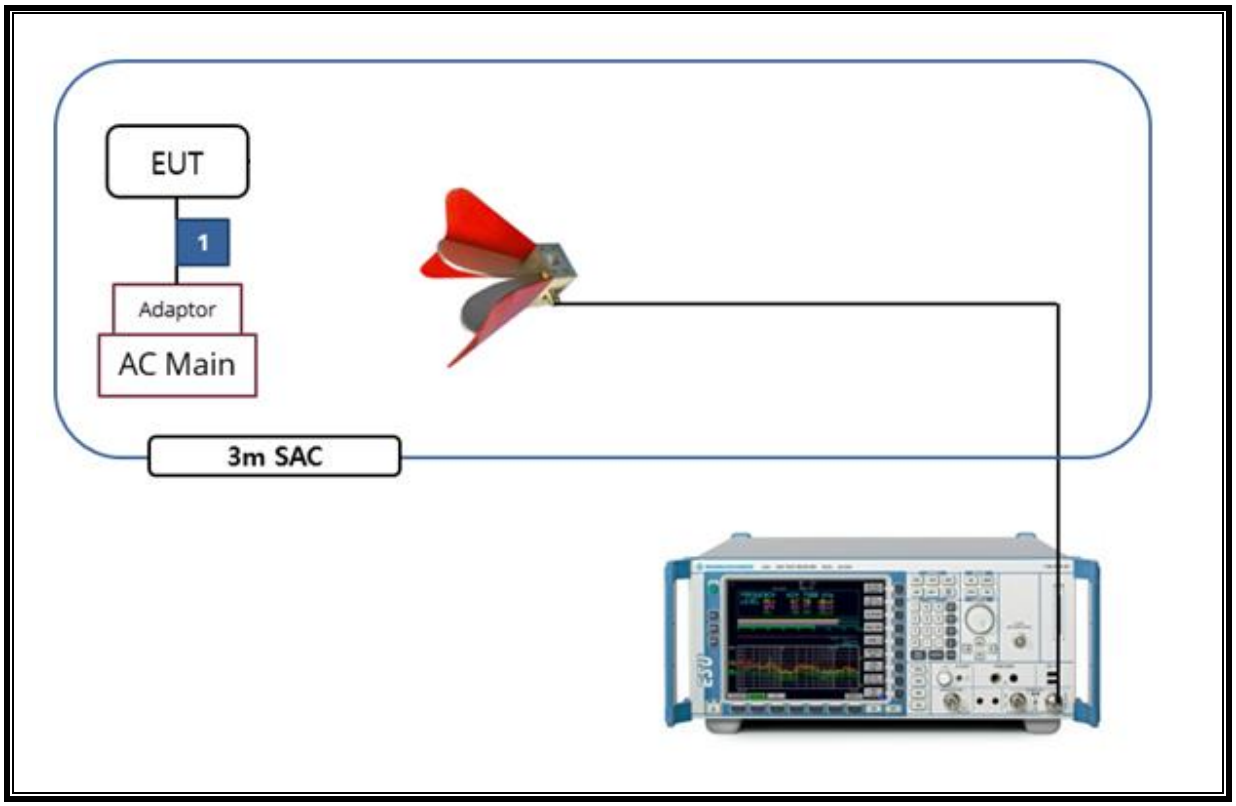
SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)



SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)



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6. MEASUREMENT METHOD

6 dB BW : KDB 558074 D01 v05r02, Section 8.2.

OUTPUT POWER : KDB 558074 D01 v05r02, Section 8.3.1.1

POWER SPECTRAL DENSITY : KDB 558074 D01 v05r02, Section 8.4.

Out-of-band Emissions (Conducted) : KDB 558074 D01 v05r02, Section 8.5.

Out-of-band Emissions in Non-restricted Bands: KDB 558074 D01 v05r02, Section 8.5.

Out-of-band Emissions in Restricted Bands : KDB 558074 D01 v05r02, Section 8.6.

AC Power Line Conducted Emission : ANSI C63.10-2013, Section 6.2

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7. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Test Equipment List				
Description	**Manufacturer**	**Model**	**S/N**	**Cal Due**
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	750	2022-08-19
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	749	2022-08-13
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	845	2022-08-13
Antenna, Horn, 18 GHz	ETS	3115	00167211	2022-07-27
Antenna, Horn, 18 GHz	ETS	3115	00161451	2022-08-15
Antenna, Horn, 18 GHz	ETS	3117	00168724	2022-07-27
Antenna, Horn, 18 GHz	ETS	3117	00168717	2022-08-15
Antenna, Horn, 40 GHz	ETS	3116C	00166155	2022-08-04
Antenna, Horn, 40 GHz	ETS	3116C	00168645	2021-10-02
Preamplifier	ETS	3116C-PA	00168841	2021-08-06
Preamplifier, 1000 MHz	Sonoma	310N	341282	2021-08-03
Preamplifier, 1000 MHz	Sonoma	310N	351741	2021-08-03
Preamplifier, 1000 MHz	Sonoma	310N	370599	2021-08-06
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1876511	2021-08-03
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1896138	2021-08-03
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	2029169	2021-08-04
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	2021-08-05
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54490312	2021-08-05
Spectrum Analyzer, 43.5 GHz	R&S	FSW43	104089	2021-08-06
Average Power Sensor	Agilent / HP	U2000	MY54270007	2021-08-05
Attenuator	PASTERNACK	PE7087-10	A001	2021-08-03
Attenuator	PASTERNACK	PE7087-10	A008	2021-08-03
Attenuator	PASTERNACK	PE7004-10	2	2021-08-04
Attenuator	PASTERNACK	PE7087-10	A009	2021-08-03
EMI Test Receive, 40 GHz	R&S	ESU40	100439	2021-08-03
EMI Test Receive, 40 GHz	R&S	ESU40	100457	2021-08-03
EMI Test Receive, 3 GHz	R&S	ESR3	101832	2021-08-03
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	009	2021-08-03
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	015	2021-08-03
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	020	2021-08-04
High Pass Filter 3GHz	Micro-Tronics	HPM17543	010	2021-08-03
High Pass Filter 3GHz	Micro-Tronics	HPM17543	015	2021-08-03
High Pass Filter 3GHz	Micro-Tronics	HPM17543	020	2021-08-04
High Pass Filter 6GHz	Micro-Tronics	HPS17542	009	2021-08-03
High Pass Filter 6GHz	Micro-Tronics	HPS17542	016	2021-08-03
High Pass Filter 6GHz	Micro-Tronics	HPS17542	021	2021-08-04
LISN	R&S	ENV-216	101837	2021-08-06
Antenna, Loop, 9kHz-30MHz	R&S	HFH2-Z2	100418	2021-10-02

UL Software			
Description	**Manufacturer**	**Model**	**Version**
Radiated software	UL	UL EMC	Ver 9.5
AC Line Conducted software	UL	UL EMC	Ver 9.5

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8. TEST RESULTS SUMMARY

FCC Part Section	Test Description	Test Limit	Test Condition	Test Result
15.247 (a)(2)	Occupied Bandwidth(6dB)	> 500kHz	Conducted	PASS
2.1051, 15.247(d)	Band Edge / Conducted Spurious Emission	-20 dBc		PASS
15.247 (b)(3)	TX conducted output power	< 30 dBm		PASS
15.247(e)	PSD	< 8 dBm/3kHz		PASS
15.207(a)	AC Power Line conducted emissions	Section 11	Power Line conducted	PASS
15.205, 15.209	Radiated Spurious Emission	< 54dBuV/m(Av)	Radiated	PASS

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9. ANTENNA PORT TEST RESULTS

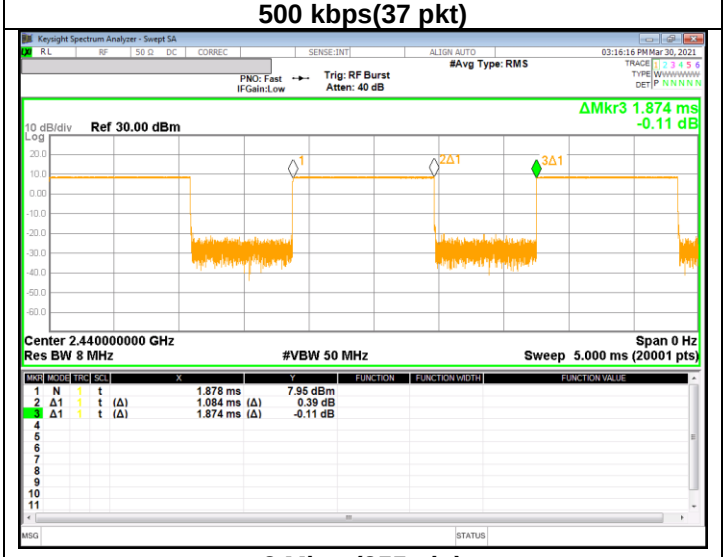
9.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

Mode	On time [msec]	Period [msec]	Duty cycle x [Linear]	Duty Cycle [%]	Duty Cycle Correction Factor [dB]	1/T Minimum VBW [kHz]
2 400 ~ 2 483.5 MHz Bands						
500 kbps [37pkt]	1.074	1.876	0.572	57.249	2.42	0.931
2 Mbps [255pkt]	1.084	1.874	0.578	57.844	2.38	0.923

500 kbps(37 pkt)



2 Mbps(255 pkt)

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9.2. 6 dB & 99% BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

RSS-247 5.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

9.2.1. 500 kbps

Channel	Frequency [MHz]	6 dB Bandwidth [kHz]	Minimum Limit [kHz]	99% Bandwidth [kHz]
Low	2 402	659.0	500.0	1016.7
Mid	2 440	659.3	500.0	1014.6
High	2 480	656.0	500.0	1012.4

9.2.2. 2 Mbps

Channel	Frequency [MHz]	6 dB Bandwidth [kHz]	Minimum Limit [kHz]	99% Bandwidth [kHz]
Low	2 402	1133.0	500.00	1977.0
Mid	2 440	1134.0	500.00	2026.9
High	2 480	1127.9	500.00	1972.7

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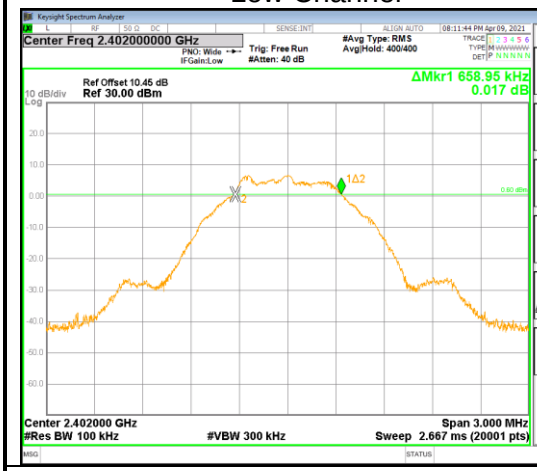
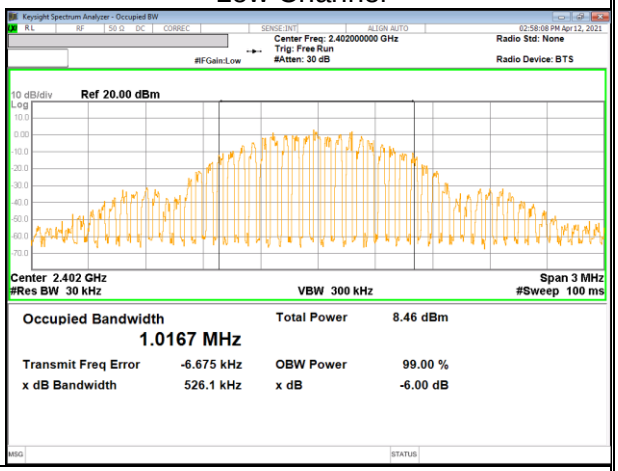
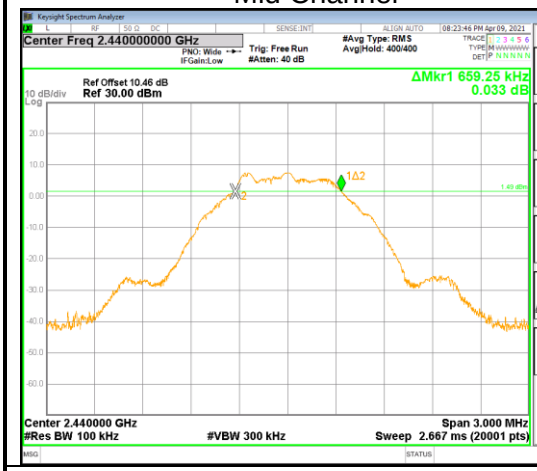
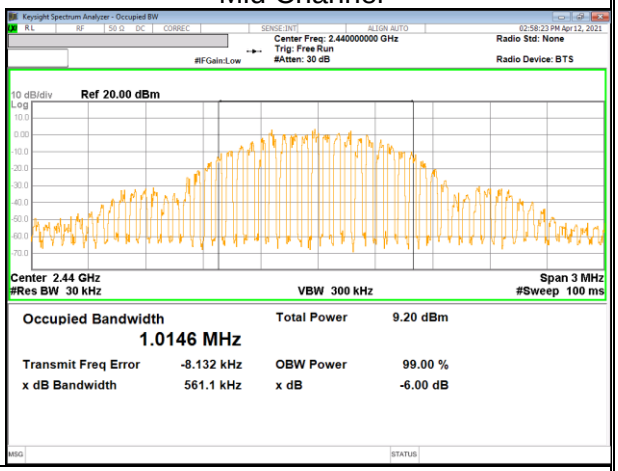
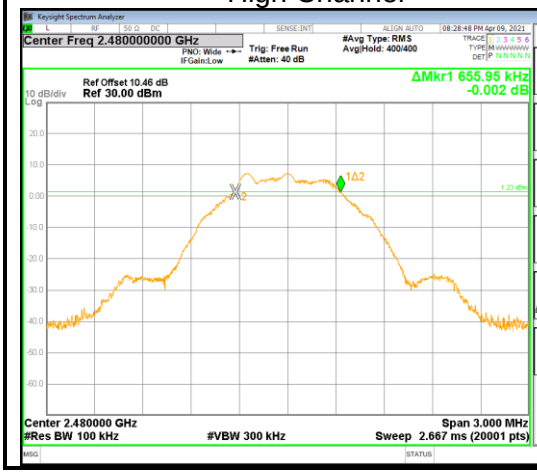
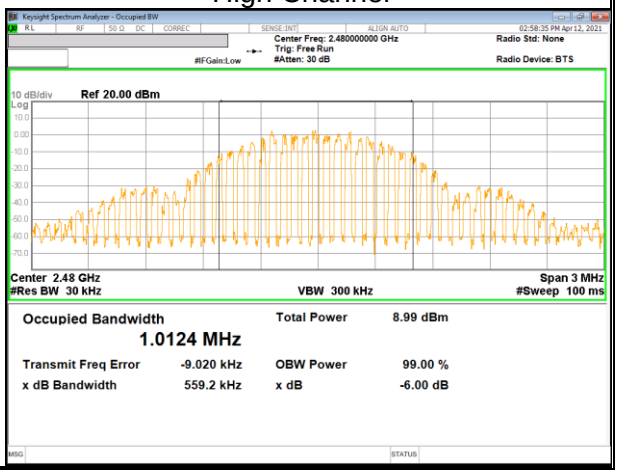
9.2.3. 6 dB & 99% BANDWIDTH PLOTS

500 kbps / 6 dB Bandwidth	500 kbps / 99% Bandwidth
Low Channel	Low Channel
	
Mid Channel	Mid Channel
	
High Channel	High Channel
	

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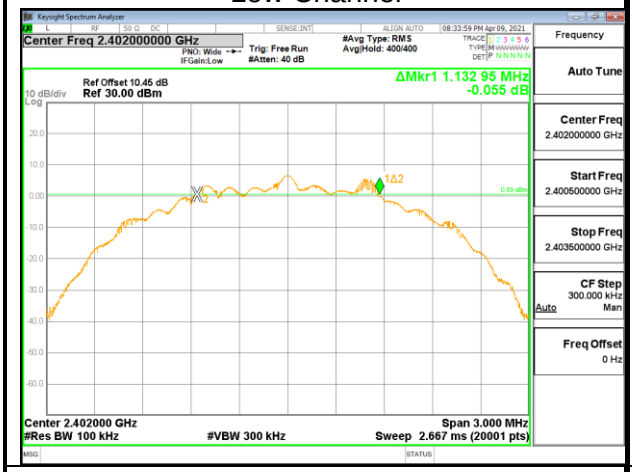
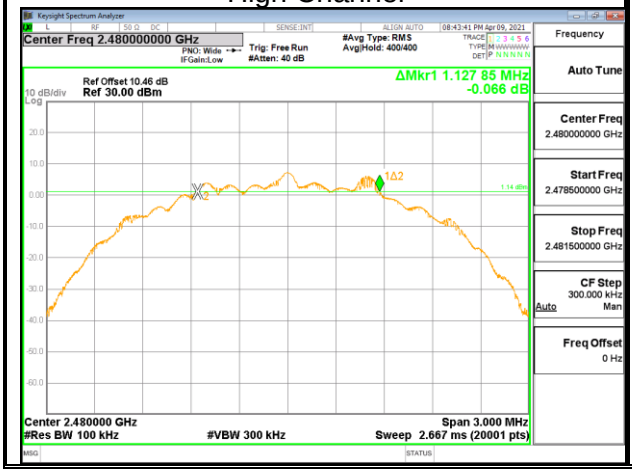
2 Mbps / 6 dB Bandwidth

Low Channel



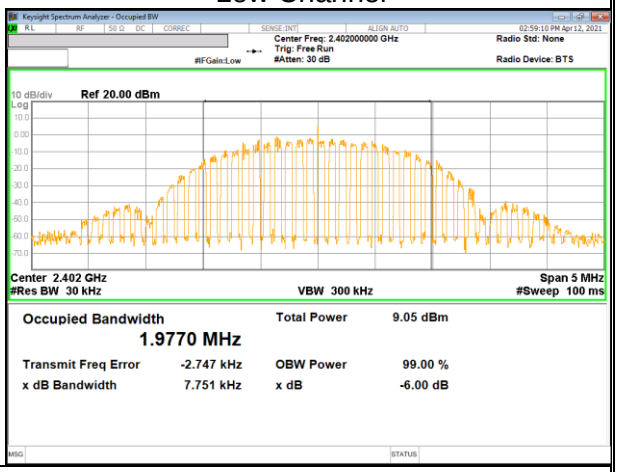
Mid Channel

High Channel

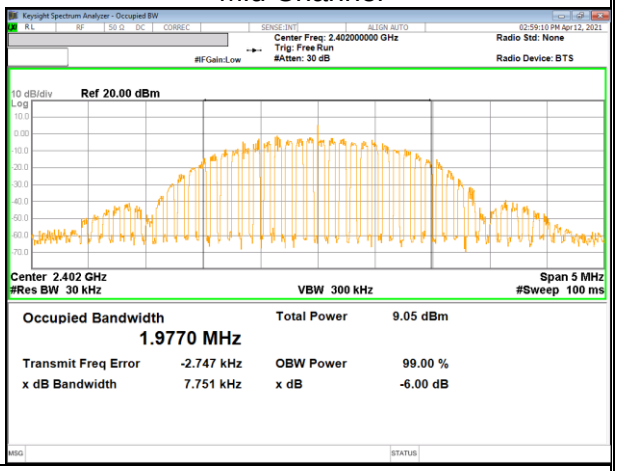


2 Mbps / 99% Bandwidth

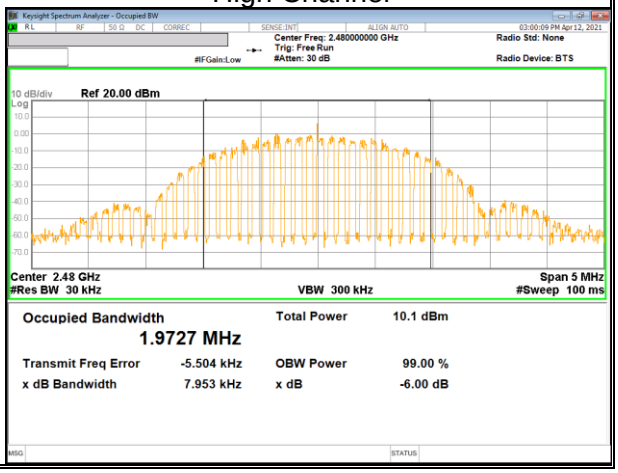
Low Channel



Mid Channel



High Channel



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9.3. OUTPUT POWER

LIMITS

FCC §15.247 (b) (3)

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

TEST PROCEDURE

Peak power is measured using ANSI C63.10(2013) under section 11.9.1.1 utilizing spectrum analyzer.

RESULTS

9.3.1. 500 kbps

Channel	Frequency [MHz]	Peak Power [dBm]	Limit [dBm]	Margin [dB]
Low	2402	7.155	30.000	-22.845
Mid	2440	7.977	30.000	-22.023
High	2480	7.678	30.000	-22.322
Worst		**7.977**	**30.000**	**-22.023**

9.3.2. 2 Mbps

Channel	Frequency [MHz]	Peak Power [dBm]	Limit [dBm]	Margin [dB]
Low	2402	7.130	30.000	-22.870
Mid	2440	8.060	30.000	-21.940
High	2480	7.818	30.000	-22.182
Worst		**8.060**	**30.000**	**-21.940**

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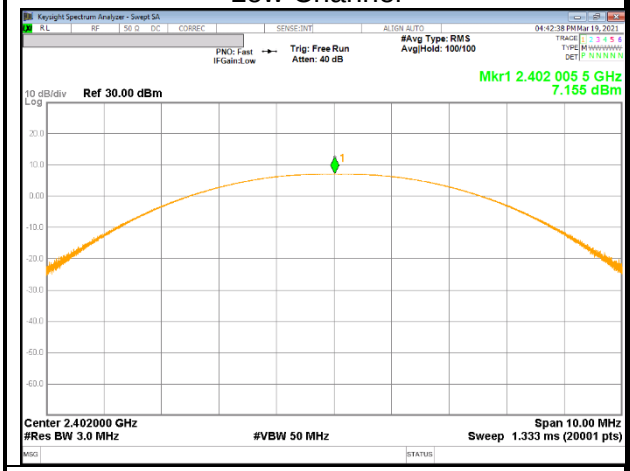
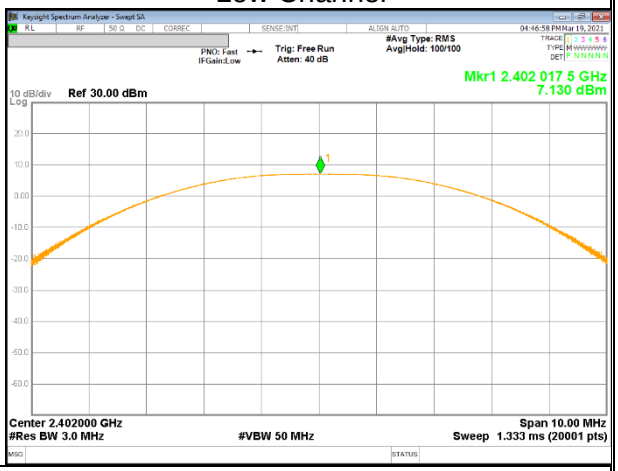
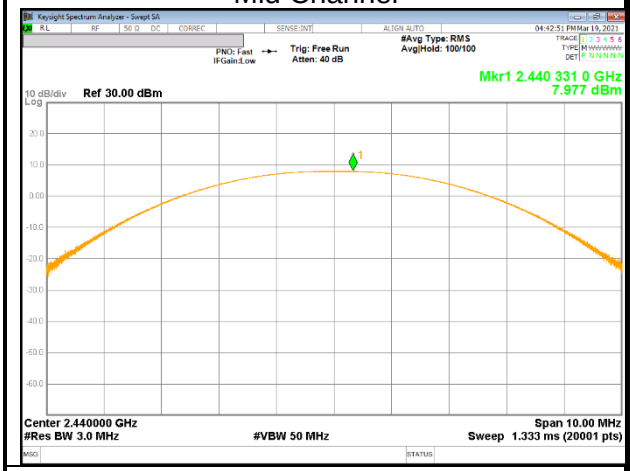
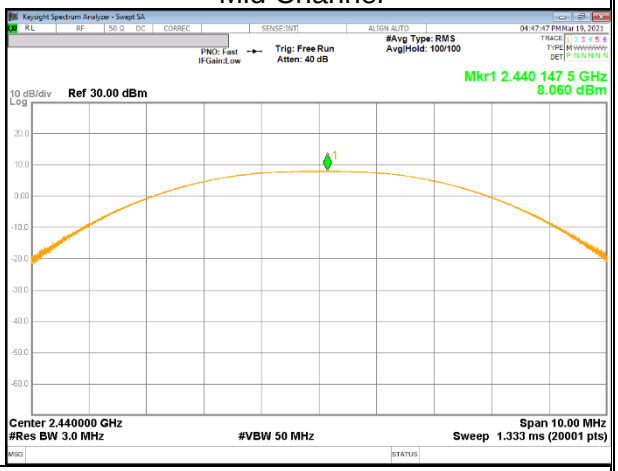
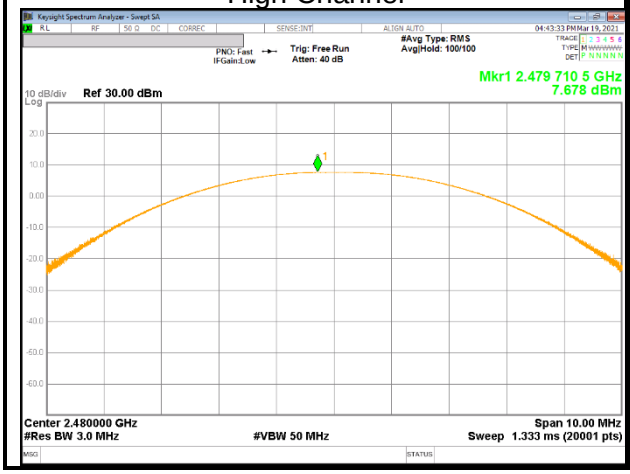
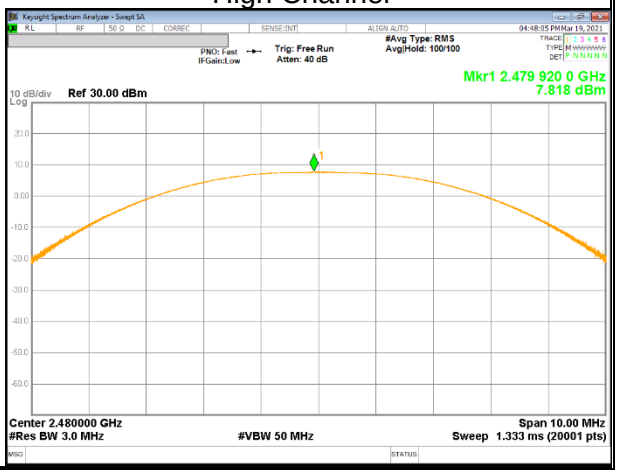
9.3.3. PEAK POWER PLOTS

500 kbps	2 Mbps
Low Channel	Low Channel
	
Mid Channel	Mid Channel
	
High Channel	High Channel
	

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9.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

Measurements perform using a wideband RF frame average power sensor.
The cable assembly insertion loss and duty cycle correction factor were entered as an offset in the power meter to allow for direct reading of power.

RESULTS

9.4.1. 500 kbps

Channel	Frequency [MHz]	AV Power [dBm]	AV Power [mW]
Low	2402	6.731	4.710
Mid	2440	7.616	5.776
High	2480	7.327	5.404

9.4.2. 2 Mbps

Channel	Frequency [MHz]	AV Power [dBm]	AV Power [mW]
Low	2402	6.479	4.446
Mid	2440	7.359	5.444
High	2480	7.081	5.106

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9.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

RSS-247 (5.2) (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

RESULTS

9.5.1. 500 kbps

Channel	Frequency [MHz]	PSD [dBm/3kHz]	Limit [dBm/3kHz]	Margin [dB]
Low	2402	0.123	8.000	-7.877
Mid	2440	0.995	8.000	-7.005
High	2480	0.711	8.000	-7.289

9.5.2. 2Mbps

Channel	Frequency [MHz]	PSD [dBm/3kHz]	Limit [dBm/3kHz]	Margin [dB]
Low	2402	-9.786	8.000	-17.786
Mid	2440	-8.966	8.000	-16.966
High	2480	-9.295	8.000	-17.295

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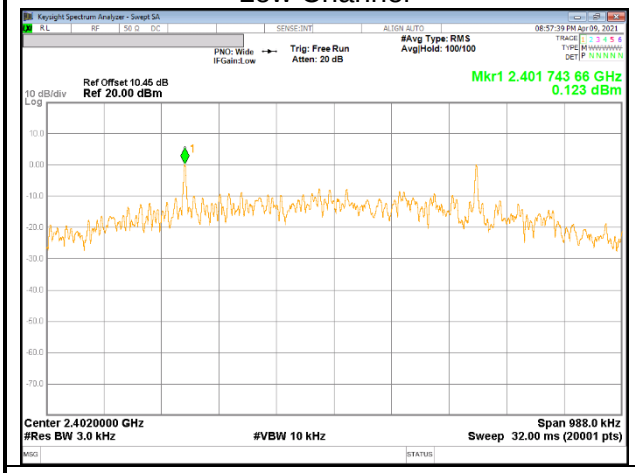
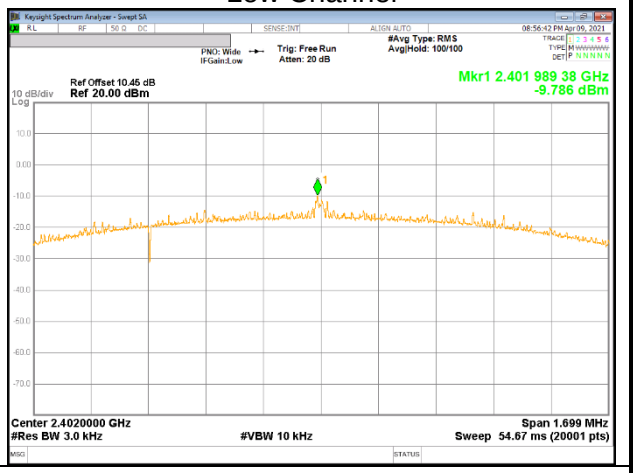
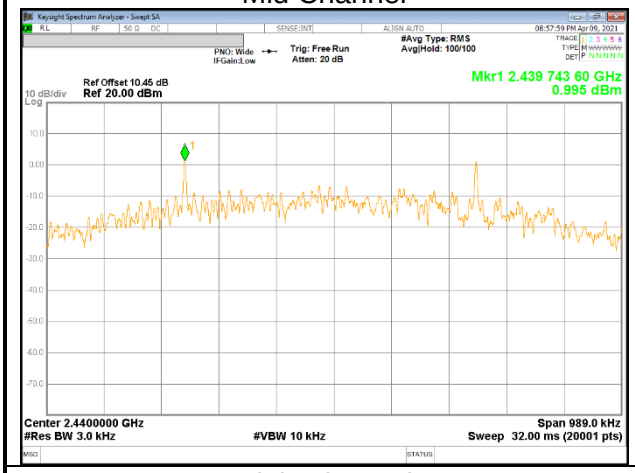
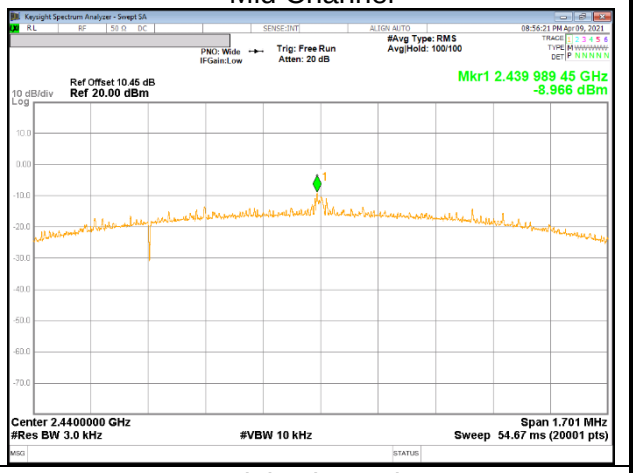
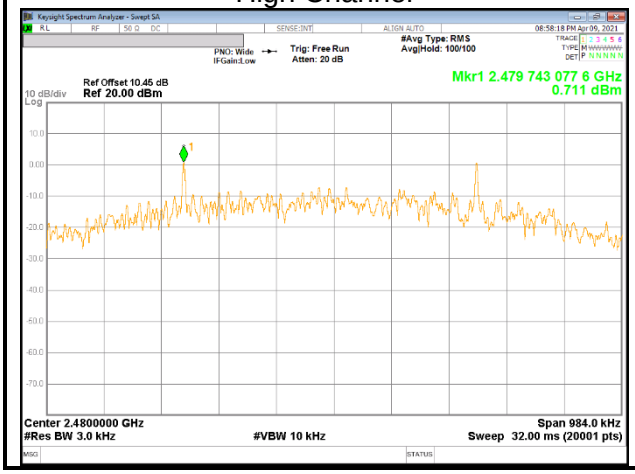
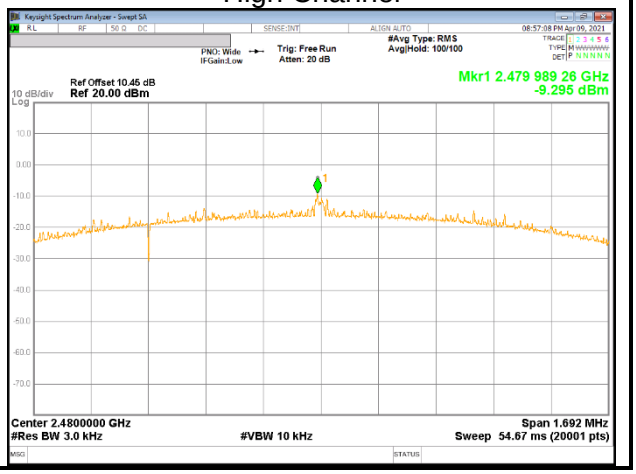
9.5.3. PSD TEST PLOTS

500 kbps	2 Mbps
Low Channel	Low Channel
	
Mid Channel	Mid Channel
	
High Channel	High Channel
	

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9.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

RSS-247 5.5

Output power was measured based on the use of a peak measurement.
Therefore, spurious emissions are required to be 20 dBc.

RESULTS

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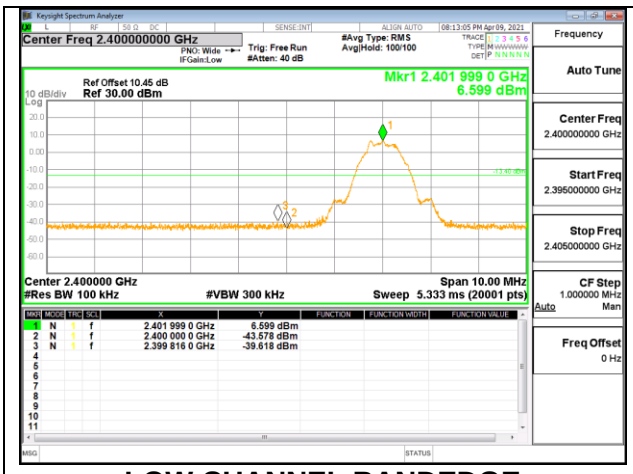
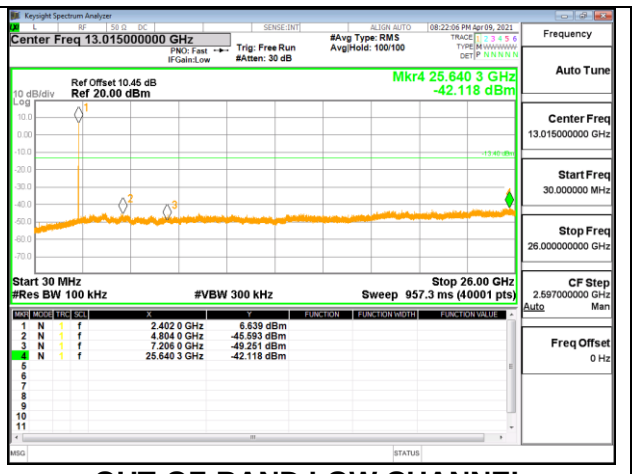
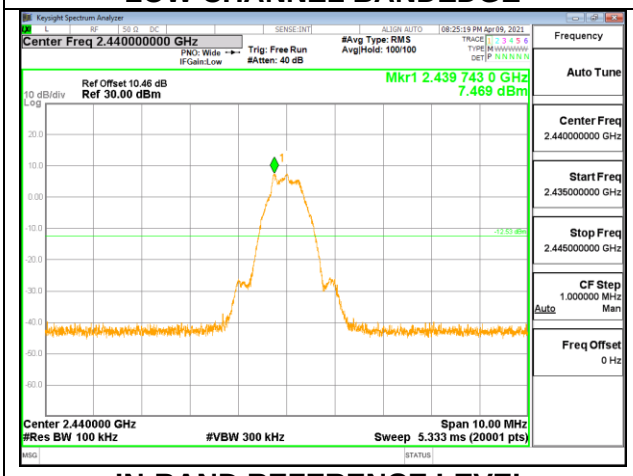
9.6.1. 500 kbps



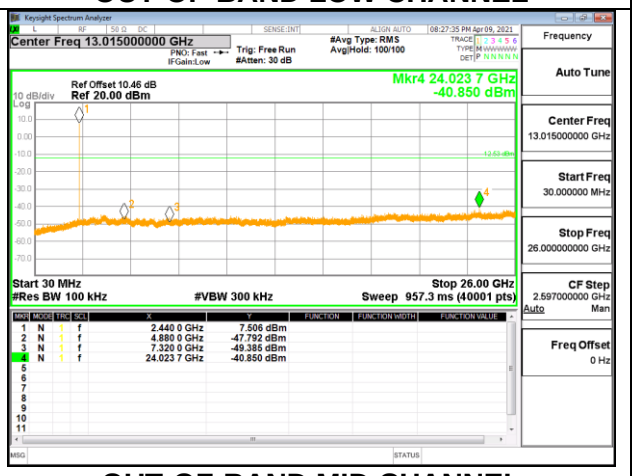
LOW CHANNEL BANDEDGE



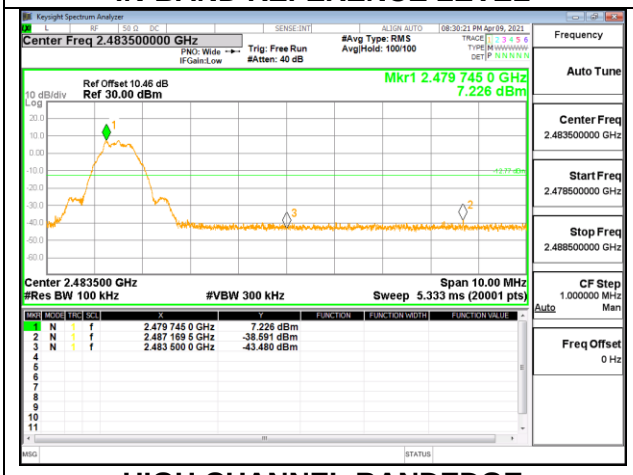
OUT-OF-BAND LOW CHANNEL



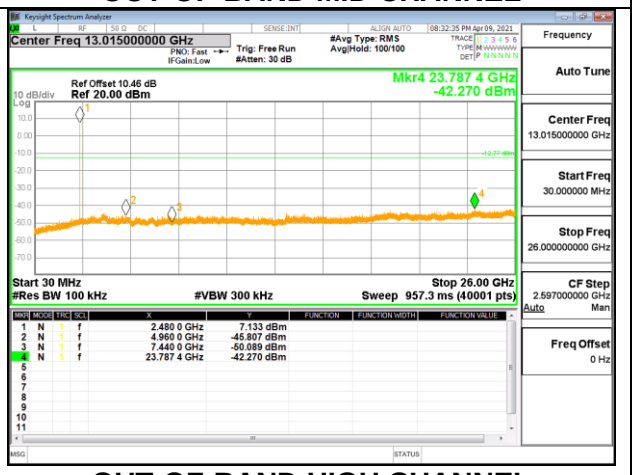
IN-BAND REFERENCE LEVEL



OUT-OF-BAND MID CHANNEL



HIGH CHANNEL BANDEDGE



OUT-OF-BAND HIGH CHANNEL

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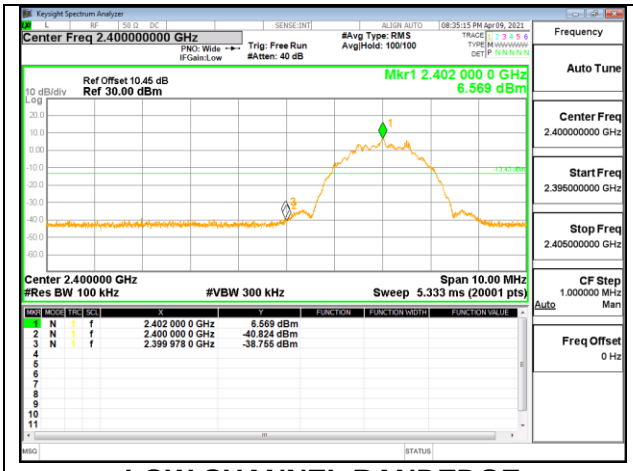
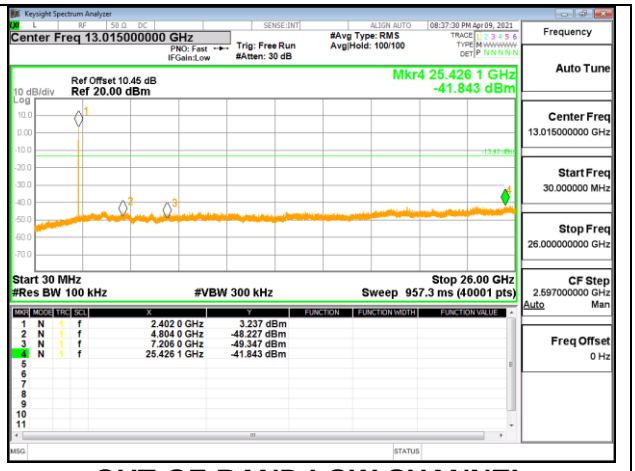
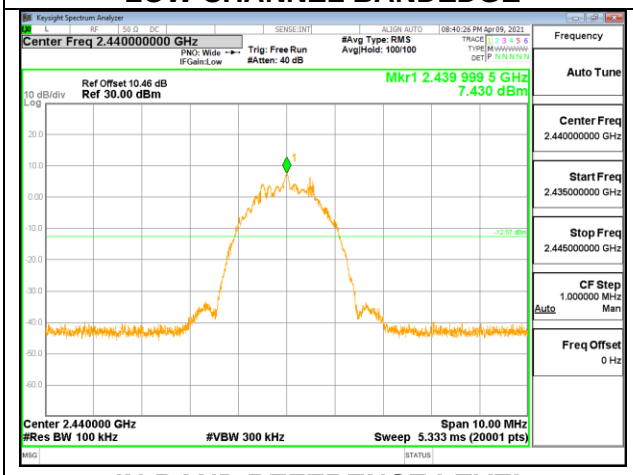
9.6.2. 2Mbps



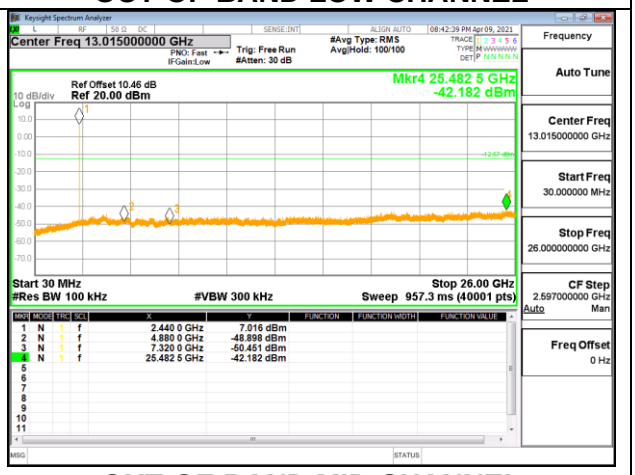
LOW CHANNEL BANDEDGE



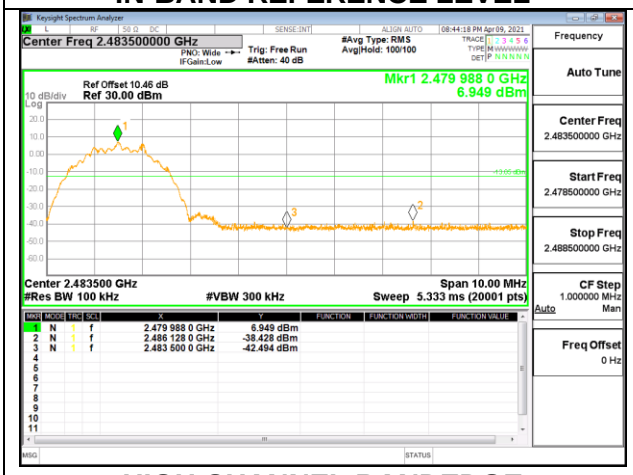
OUT-OF-BAND LOW CHANNEL



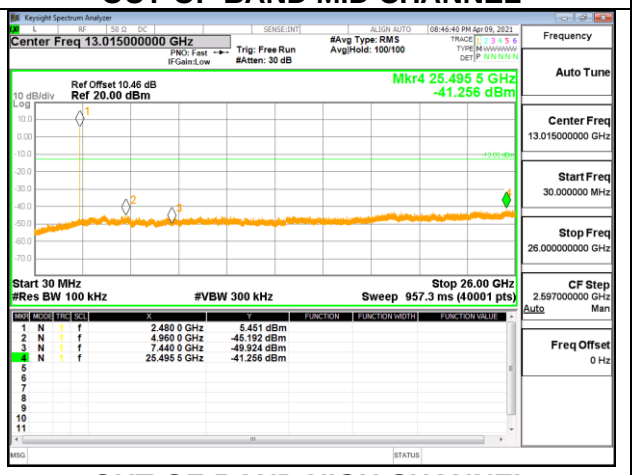
IN-BAND REFERENCE LEVEL



OUT-OF-BAND MID CHANNEL



HIGH CHANNEL BANDEDGE



OUT-OF-BAND HIGH CHANNEL

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10. RADIATED TEST RESULTS

10.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

Limits for radiated disturbance of an intentional radiator		
Frequency range (MHz)	Limits (µV/m)	Measurement Distance (m)
0.009 – 0.490	2400 / F (kHz)	300
0.490 – 1.705	24000 / F (kHz)	30
1.705 – 30.0	30	30
30 – 88	100**	3
88 - 216	150**	3
216 – 960	200**	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g. §§ 15.231 and 15.241.

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TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane for below 1GHz and 150 cm for above 1GHz. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements and add duty cycle factor for average measurements. (Restriced bandedge, Final detection of spurious harmonic emissions)Duty cycle factor = 10 log (1/x). For this sample: For 500 kbps, DCF = 10log(1/0.57249)=2.422 dB
(Spectrum Analyzer round it up to 2.42 dB) and for 2 Mbps, DCF = 10log(1/0.57844)=2.377 dB
(Spectrum Analyzer round it up to 2.38 dB).

Pre-scans to detect harmonic and spurious emissions, the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 30 kHz for peak measurements.

The spectrum from 1 GHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.
(From 30MHz to 1GHz, test was performed with the EUT set to transmit at the channel with highest output power)

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

Note : Emission was pre-scanned from 9kHz to 30MHz; No emissions were detected which was at least 20dB below the specification limit (consider distance correction factor).
Per FCC part 15.31(o), test results were not reported.

Although these tests were performed other than open field test site, adequate comparison measurements were confirmed against 30 m open are test site.
Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the one of tests made in an open field based on KDB 414788.

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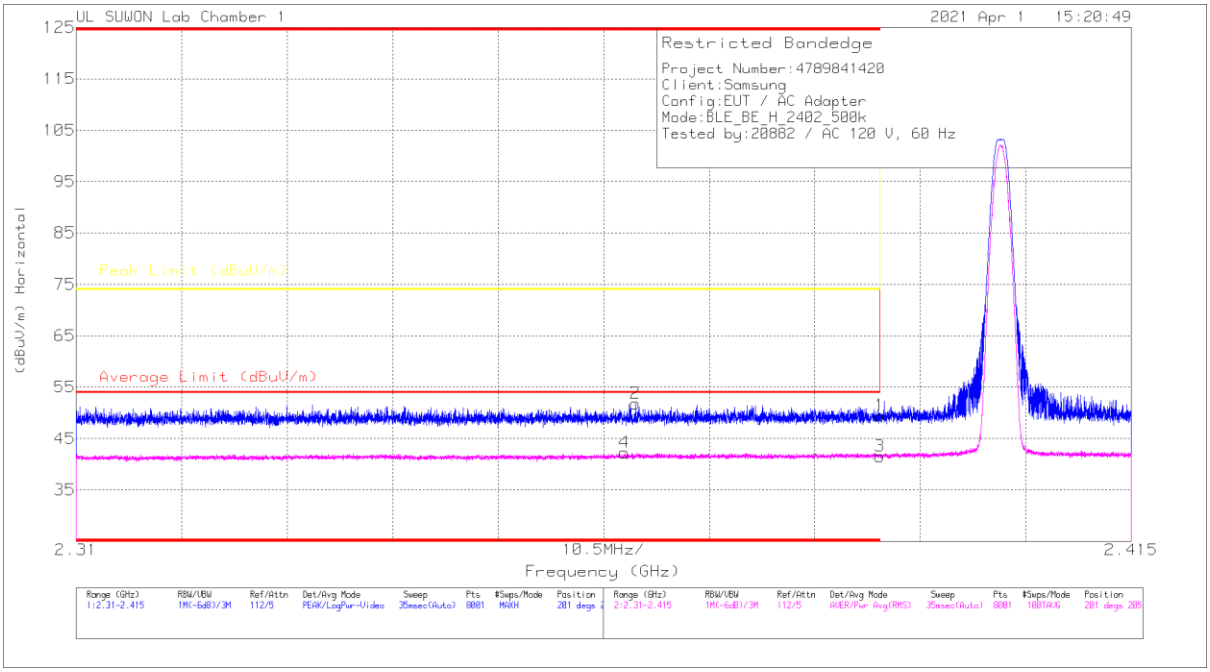
10.2. TRANSMITTER ABOVE 1 GHz

10.2.1. 500 kbps

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	43.27	Pk	31.8	-25.6	0	49.47	-	-	74	-24.53	201	205	H
2	* 2.36566	45.63	Pk	31.7	-25.5	0	51.83	-	-	74	-22.17	201	205	H
3	* 2.39	32.95	RMS	31.8	-25.6	2.42	41.57	54	-12.43	-	-	201	205	H
4	* 2.36456	33.76	RMS	31.7	-25.6	2.42	42.28	54	-11.72	-	-	201	205	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
RMS - RMS detection

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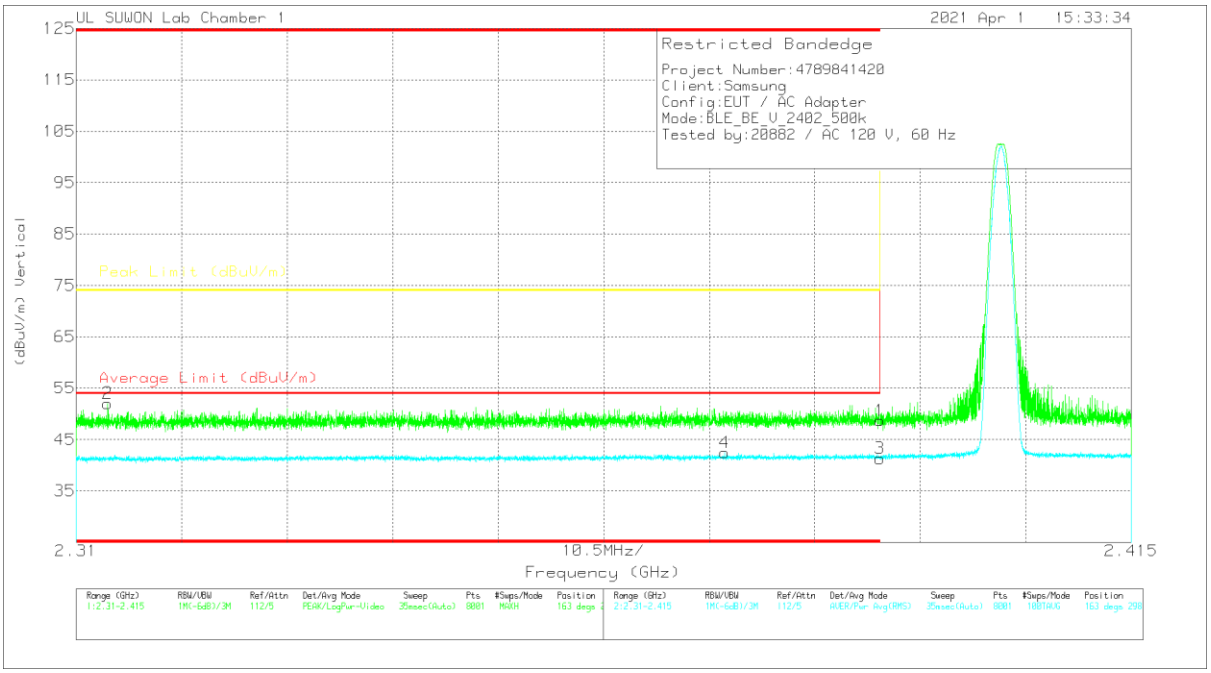
VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	42.48	Pk	31.8	-25.6	0	48.68	-	-	74	-25.32	163	298	V
2	* 2.3131	46.2	Pk	31.6	-25.8	0	52	-	-	74	-22	163	298	V
3	* 2.39	32.69	RMS	31.8	-25.6	2.42	41.31	54	-12.69	-	-	163	298	V
4	* 2.37454	33.92	RMS	31.7	-25.6	2.42	42.44	54	-11.56	-	-	163	298	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
RMS - RMS detection

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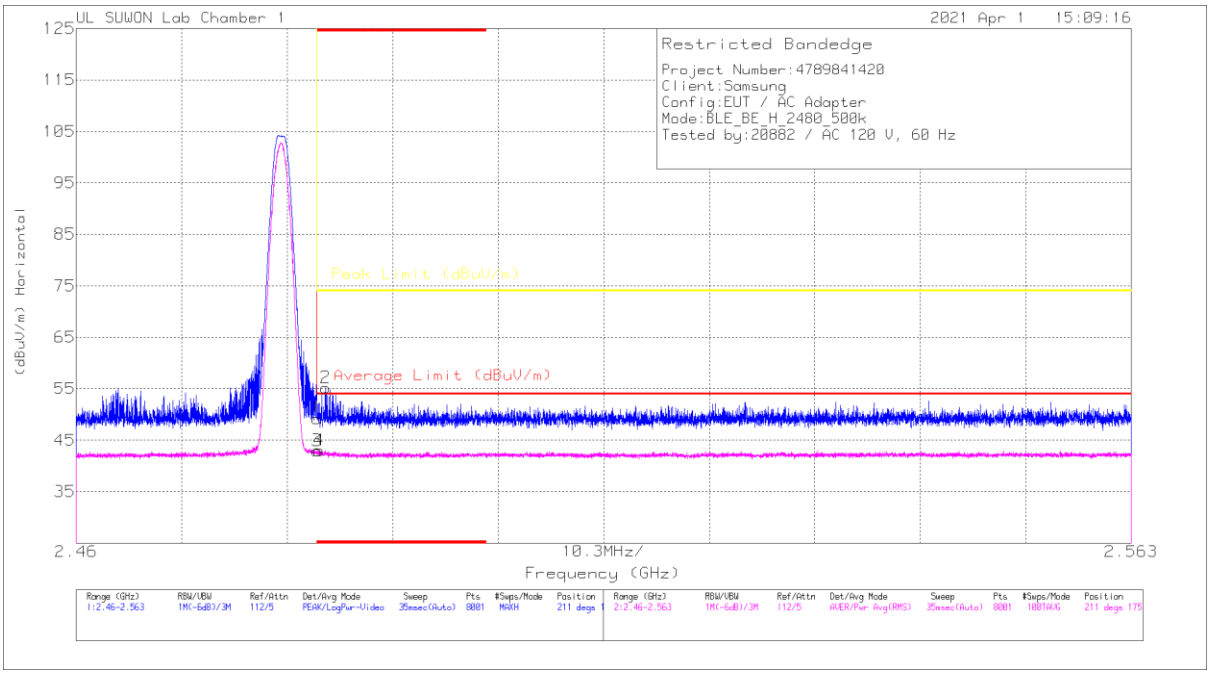
BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	42.5	Pk	32	-25.3	0	49.2	-	-	74	-24.8	211	175	H
2	* 2.48433	46.4	Pk	32	-25.2	0	55.2	-	-	74	-18.8	211	175	H
3	* 2.48351	33.87	RMS	32	-25.3	2.42	42.99	54	-11.01	-	-	211	175	H
4	* 2.4837	33.9	RMS	32	-25.3	2.42	43.02	54	-10.98	-	-	211	175	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
RMS - RMS detection

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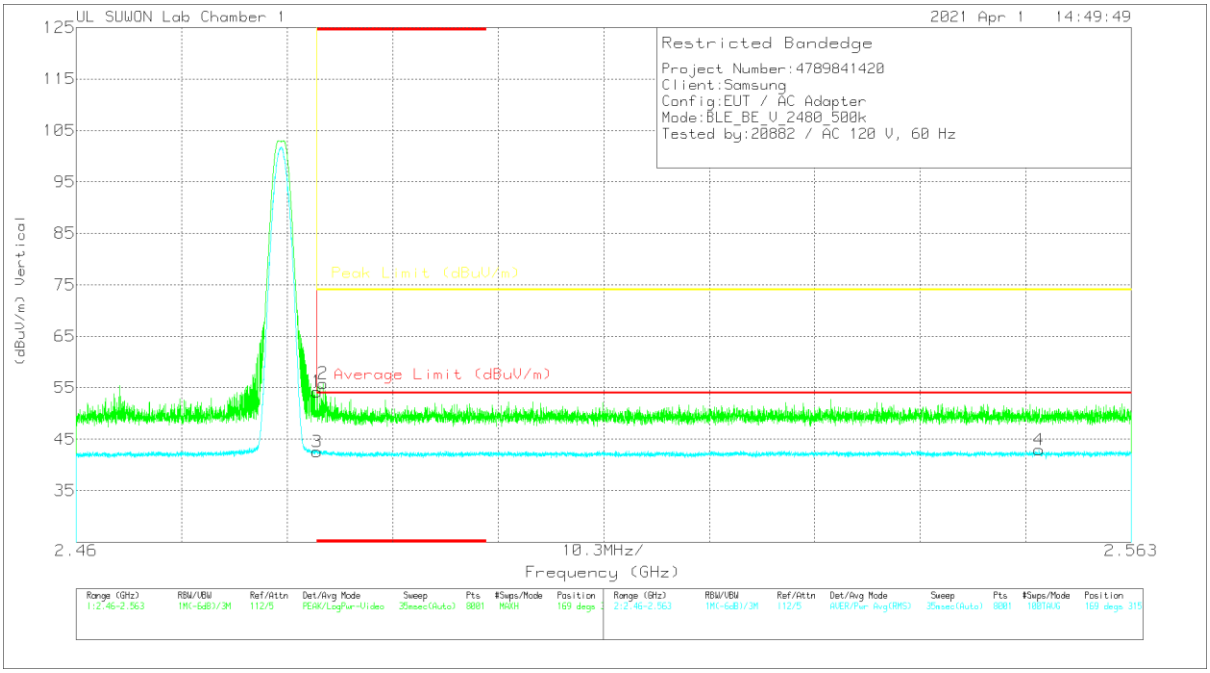
VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	47.54	Pk	32	-25.3	0	54.24	-	-	74	-19.76	169	315	V
2	* 2.48409	49.13	Pk	32	-25.3	0	55.83	-	-	74	-18.17	169	315	V
3	* 2.48351	33.46	RMS	32	-25.3	2.42	42.58	54	-11.42	-	-	169	315	V
4	2.554	33.62	RMS	32.1	-25.2	2.42	42.94	54	-11.06	-	-	169	315	V

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Pk - Peak detector
RMS - RMS detection

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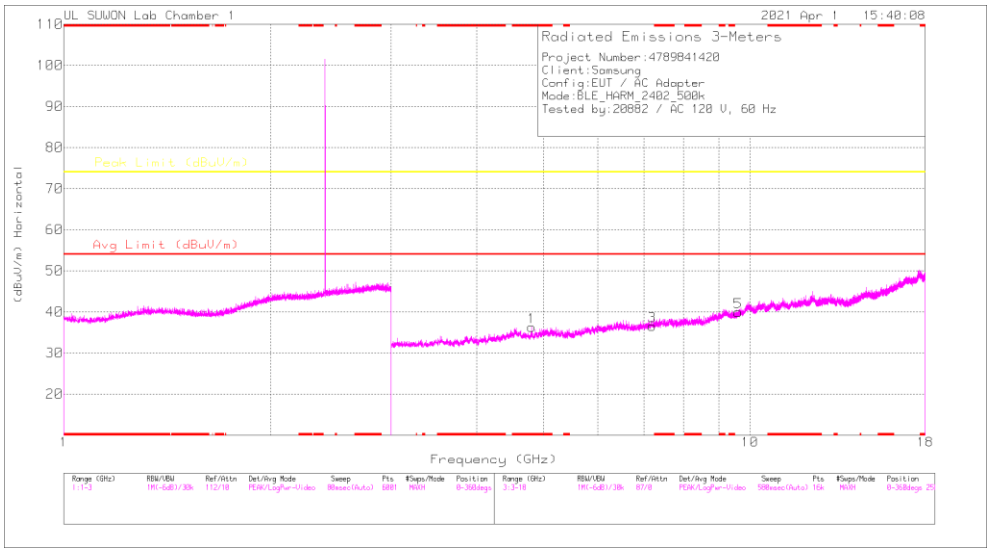
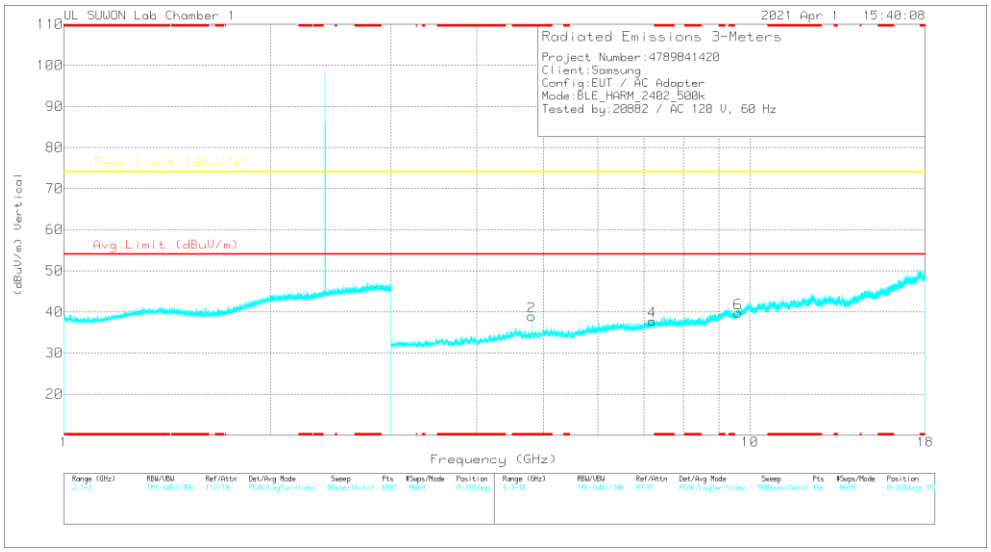
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



HORIZONTAL



VERTICAL

Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.8035	32.52	PK2	34.1	-31.5	0	35.12	-	-	74	-38.88	69	114	H
* 4.80364	31.73	MAv1	34.1	-31.5	2.42	36.75	54	-17.25	-	-	69	114	H
* 4.80432	44.06	PK2	34.1	-31.5	0	46.66	-	-	74	-27.34	32	103	V
* 4.80348	32.97	MAv1	34.1	-31.5	2.42	37.99	54	-16.01	-	-	32	103	V
7.20493	38.65	PK2	35.9	-27.6	0	46.95	-	-	74	-27.05	0	100	H
7.20425	37.3	PK2	35.9	-27.7	0	45.5	-	-	74	-28.5	0	100	V
9.60987	35.55	PK2	37.1	-23.1	0	49.55	-	-	74	-24.45	0	100	H
9.60924	34.81	PK2	37.1	-23	0	48.91	-	-	74	-25.09	0	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK2 - KDB558074 Method: Maximum Peak

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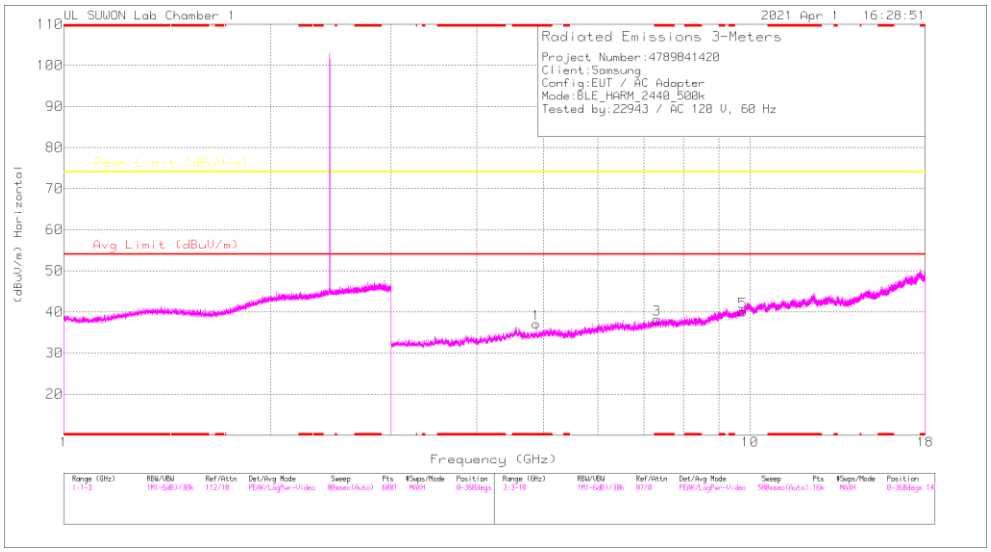
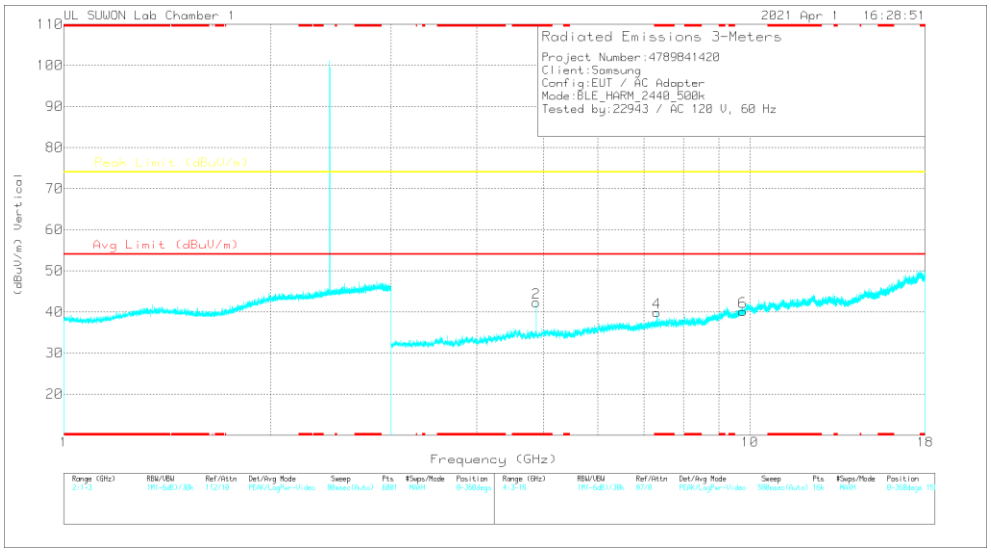
MID CHANNEL RESULTS



HORIZONTAL



VERTICAL

Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_0016871 7	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.87966	43.51	PK2	34.1	-31.4	0	46.21	-	-	74	-27.79	71	147	H
* 4.87964	32.53	MAv1	34.1	-31.4	2.42	37.65	54	-16.35	-	-	71	147	H
* 4.87956	45.68	PK2	34.1	-31.4	0	48.38	-	-	74	-25.62	146	224	V
* 4.8796	36.1	MAv1	34.1	-31.4	2.42	41.22	54	-12.78	-	-	146	224	V
* 7.31524	38.74	PK2	35.8	-27.4	0	47.14	-	-	74	-26.86	136	388	H
* 7.31942	26.76	MAv1	35.8	-27.2	2.42	37.78	54	-16.22	-	-	136	388	H
* 7.31914	39.97	PK2	35.8	-27.2	0	48.57	-	-	74	-25.43	128	193	V
* 7.32064	28.8	MAv1	35.8	-27.3	2.42	39.72	54	-14.28	-	-	128	193	V
9.75533	36.05	PK2	37.4	-23.7	0	49.75	-	-	74	-24.25	0	100	H
9.75597	35.12	PK2	37.4	-23.7	0	48.82	-	-	74	-25.18	0	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK2 - KDB558074 Method: Maximum Peak

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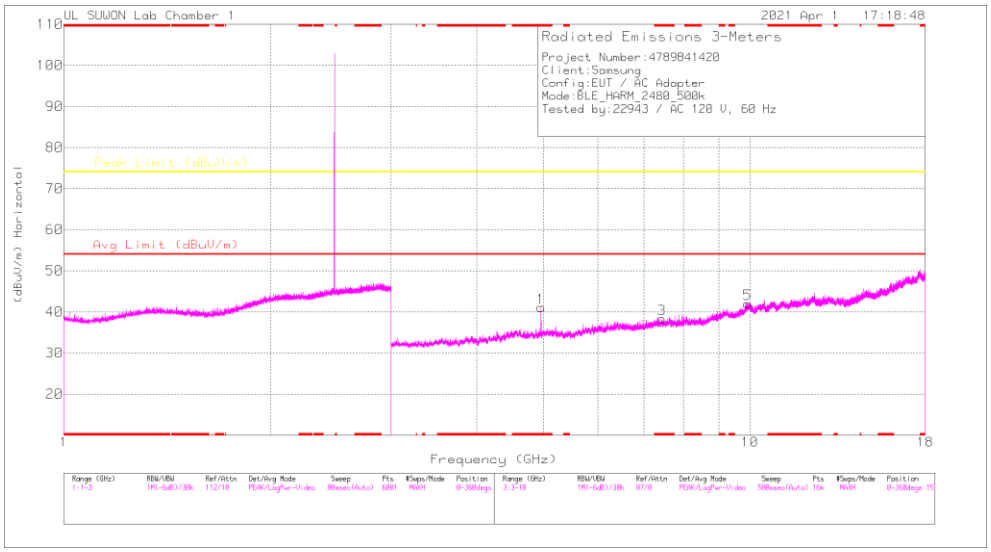
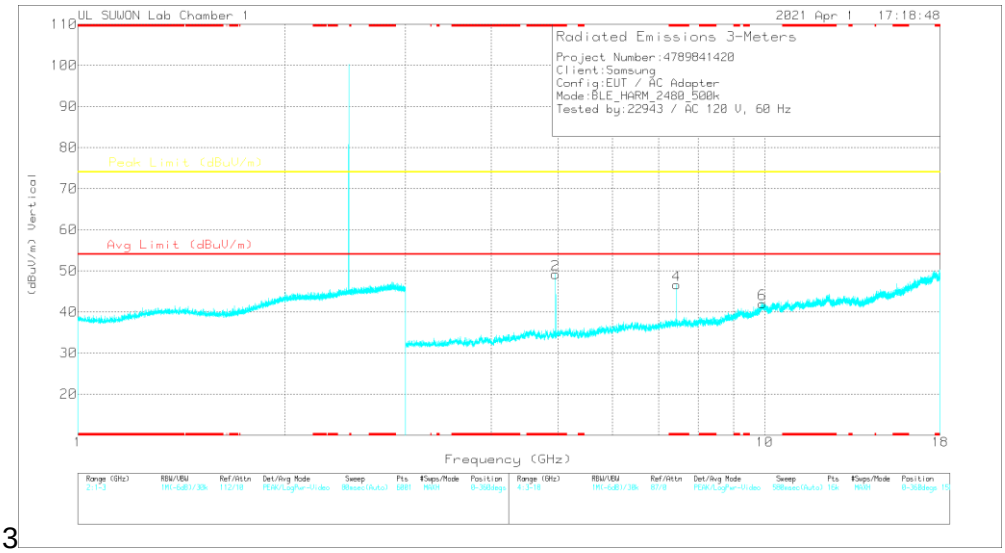
HIGH CHANNEL RESULTS



HORIZONTAL



3

VERTICAL

Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_0016871 7	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.96058	47.28	PK2	34.1	-31.5	0	49.88	-	-	74	-24.12	175	396	H
* 4.96032	38.71	MAv1	34.1	-31.5	2.42	43.73	54	-10.27	-	-	175	396	H
* 4.9596	47.92	PK2	34.1	-31.4	0	50.62	-	-	74	-23.38	153	167	V
* 4.9602	39.45	MAv1	34.1	-31.5	2.42	44.47	54	-9.53	-	-	153	167	V
* 7.44068	40.97	PK2	35.8	-26.8	0	49.97	-	-	74	-24.03	166	271	H
* 7.44052	28.49	MAv1	35.8	-26.8	2.42	39.91	54	-14.09	-	-	166	271	H
* 7.44068	43.67	PK2	35.8	-26.8	0	52.67	-	-	74	-21.33	97	295	V
* 7.44062	34.28	MAv1	35.8	-26.8	2.42	45.7	54	-8.3	-	-	97	295	V
9.91805	34.37	PK2	37.7	-21.6	0	50.47	-	-	74	-23.53	0	100	H
9.91782	34.27	PK2	37.7	-21.6	0	50.37	-	-	74	-23.63	0	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK2 - KDB558074 Method: Maximum Peak

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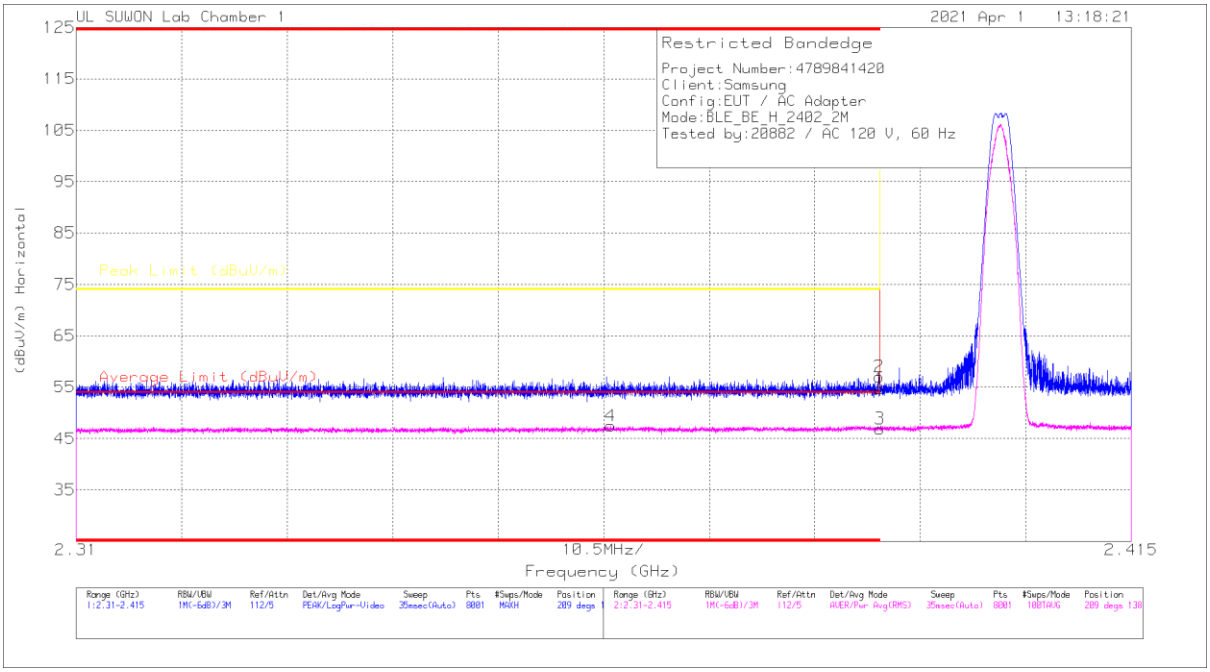
10.2.2. 2Mbps

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	43.06	Pk	31.9	-20.3	0	54.66	-	-	74	-19.34	209	138	H
2	* 2.38992	45.44	Pk	31.9	-20.3	0	57.04	-	-	74	-16.96	209	138	H
3	* 2.39	32.91	RMS	31.9	-20.3	2.38	46.89	54	-7.11	-	-	209	138	H
4	* 2.36318	33.57	RMS	31.8	-20.3	2.38	47.45	54	-6.55	-	-	209	138	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
RMS - RMS detection

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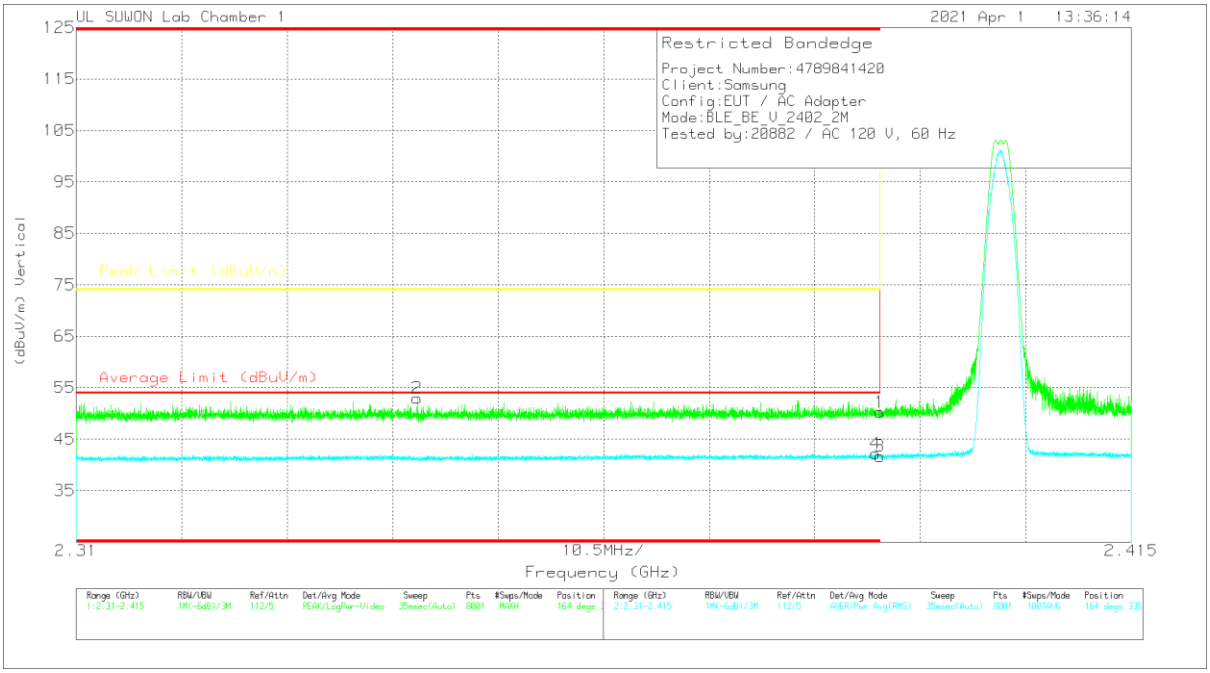
VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	44.06	Pk	31.8	-25.6	0	50.26	-	-	74	-23.74	164	335	V
2	* 2.34392	47.05	Pk	31.7	-25.8	0	52.95	-	-	74	-21.05	164	335	V
3	* 2.39	33.1	RMS	31.8	-25.6	2.38	41.68	54	-12.32	-	-	164	335	V
4	* 2.38954	33.51	RMS	31.8	-25.5	2.38	42.19	54	-11.81	-	-	164	335	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
RMS - RMS detection

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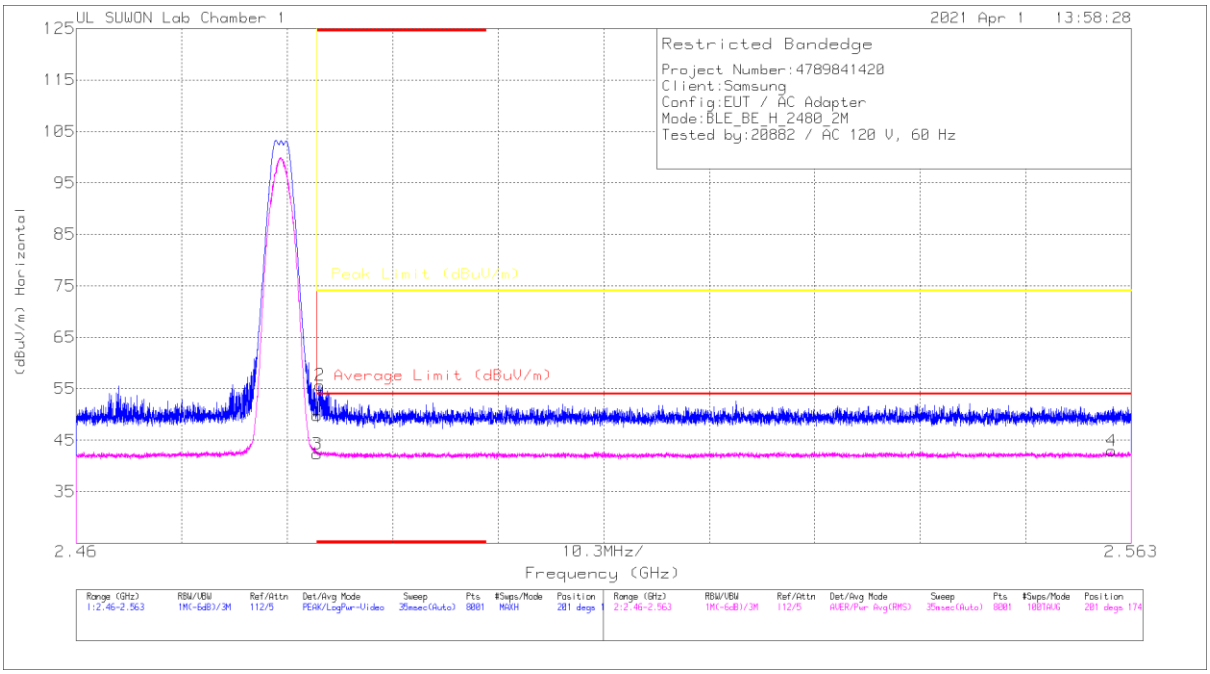
BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	43.13	Pk	32	-25.3	0	49.83	-	-	74	-24.17	201	174	H
2	* 2.48381	48.97	Pk	32	-25.3	0	55.67	-	-	74	-18.33	201	174	H
3	* 2.48351	33.24	RMS	32	-25.3	2.38	42.32	54	-11.68	-	-	201	174	H
4	2.56109	33.56	RMS	32.1	-25.1	2.38	42.94	54	-11.06	-	-	201	174	H

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Pk - Peak detector
RMS - RMS detection

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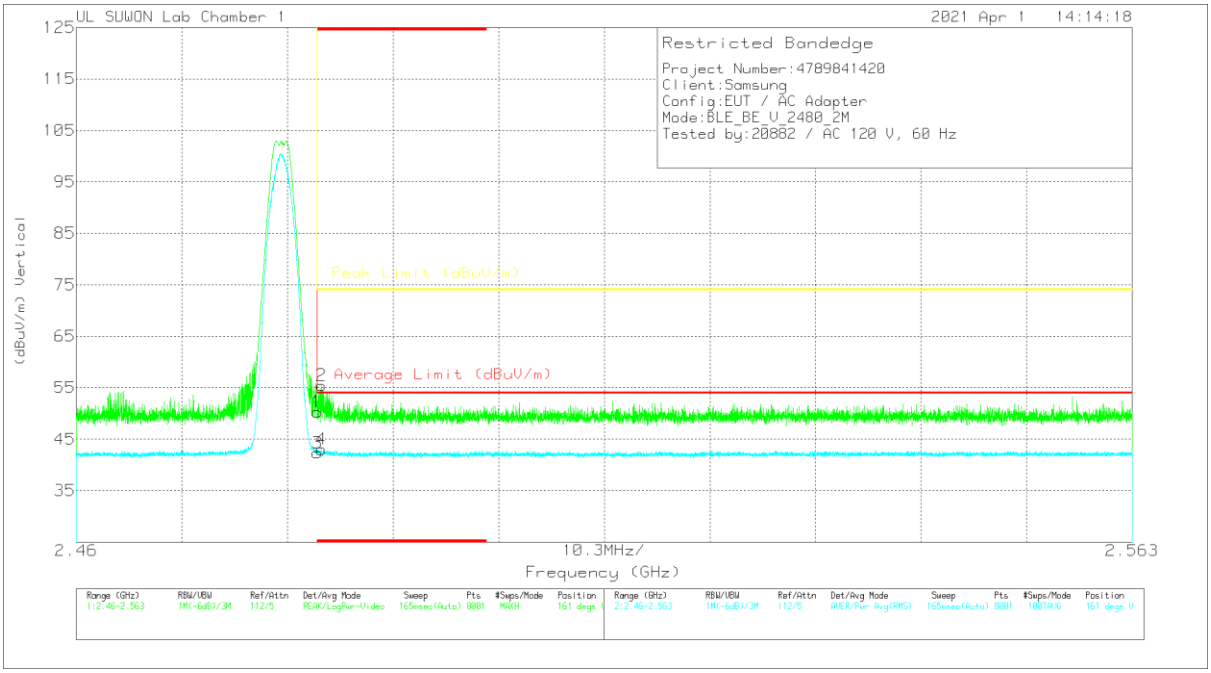
VERTICAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	43.62	Pk	32	-25.3	0	50.32	-	-	74	-23.68	161	315	V
2	* 2.48393	48.73	Pk	32	-25.3	0	55.43	-	-	74	-18.57	161	315	V
3	* 2.48351	33.24	RMS	32	-25.3	2.38	42.32	54	-11.68	-	-	161	315	V
4	* 2.48391	33.94	RMS	32	-25.3	2.38	43.02	54	-10.98	-	-	161	315	V

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Pk - Peak detector
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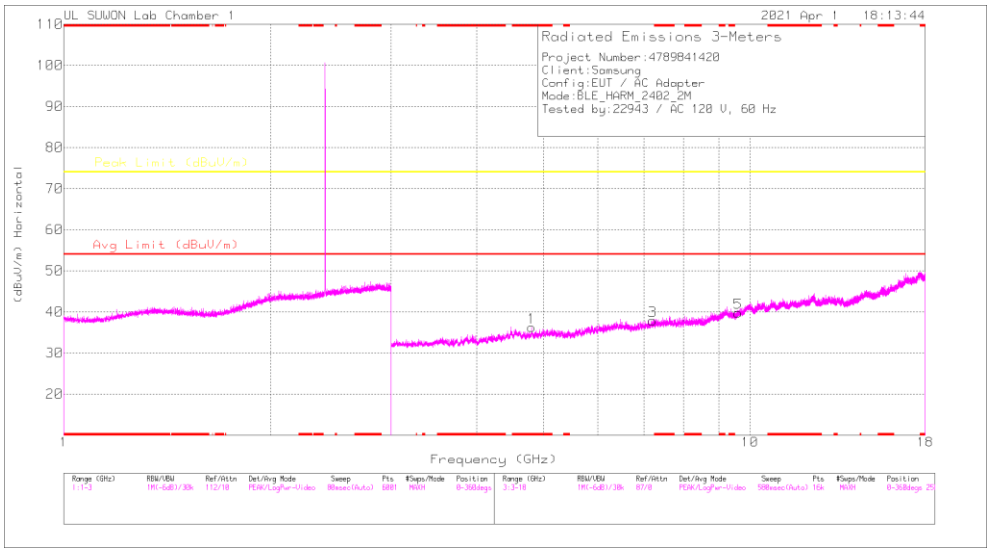
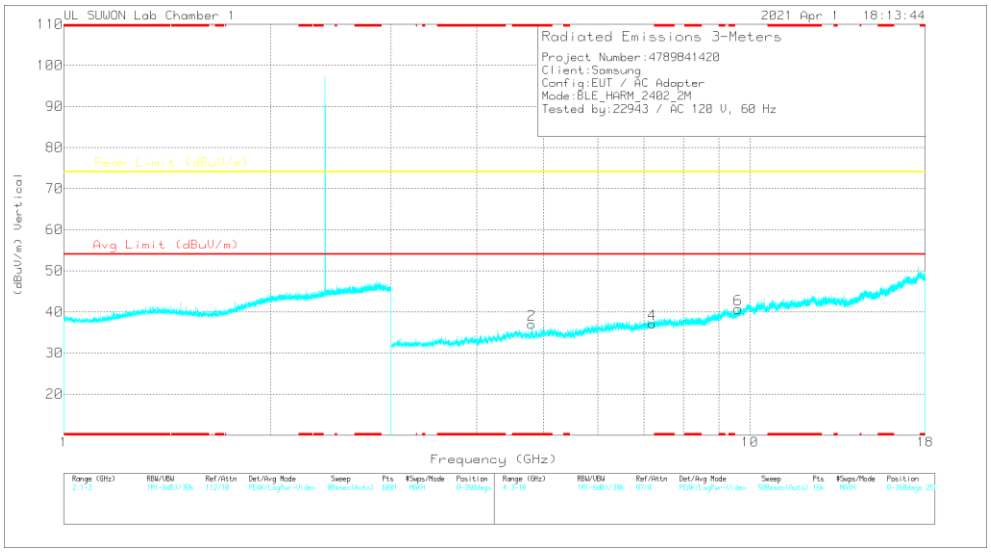
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



HORIZONTAL



VERTICAL

Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.80508	42.12	PK2	34.1	-31.4	0	44.82	-	-	74	-29.18	68	110	H
* 4.80316	30.75	MAv1	34.1	-31.5	2.38	35.73	54	-18.27	-	-	68	110	H
* 4.80384	44.01	PK2	34.1	-31.5	0	46.61	-	-	74	-27.39	35	104	V
* 4.80494	31.84	MAv1	34.1	-31.4	2.38	36.92	54	-17.08	-	-	35	104	V
7.20463	37.69	PK2	35.9	-27.6	0	45.99	-	-	74	-28.01	0	100	H
7.20392	37.75	PK2	35.9	-27.7	0	45.95	-	-	74	-28.05	0	100	V
9.60305	35.08	PK2	37.1	-23.1	0	49.08	-	-	74	-24.92	0	100	H
9.61079	34.59	PK2	37.1	-23.1	0	48.59	-	-	74	-25.41	0	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK2 - KDB558074 Method: Maximum Peak

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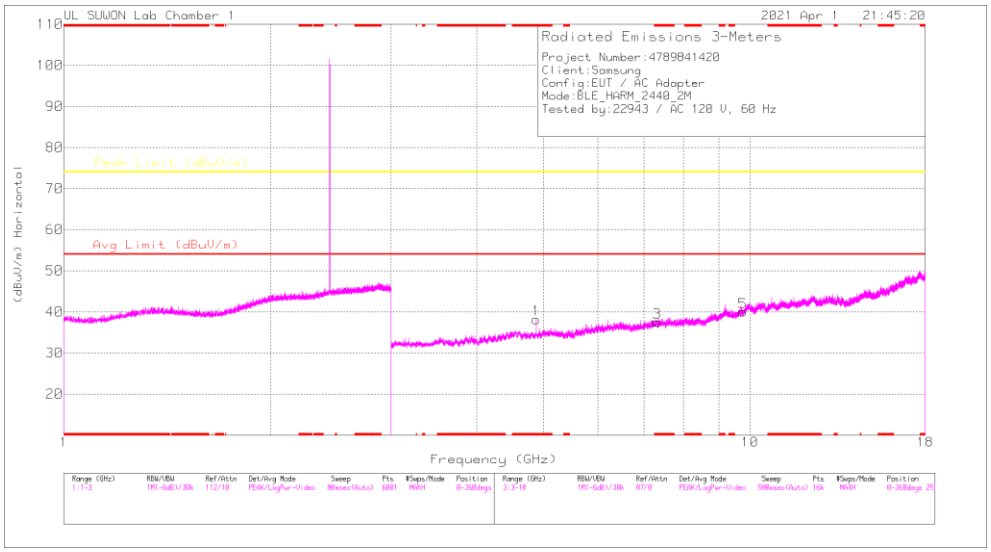
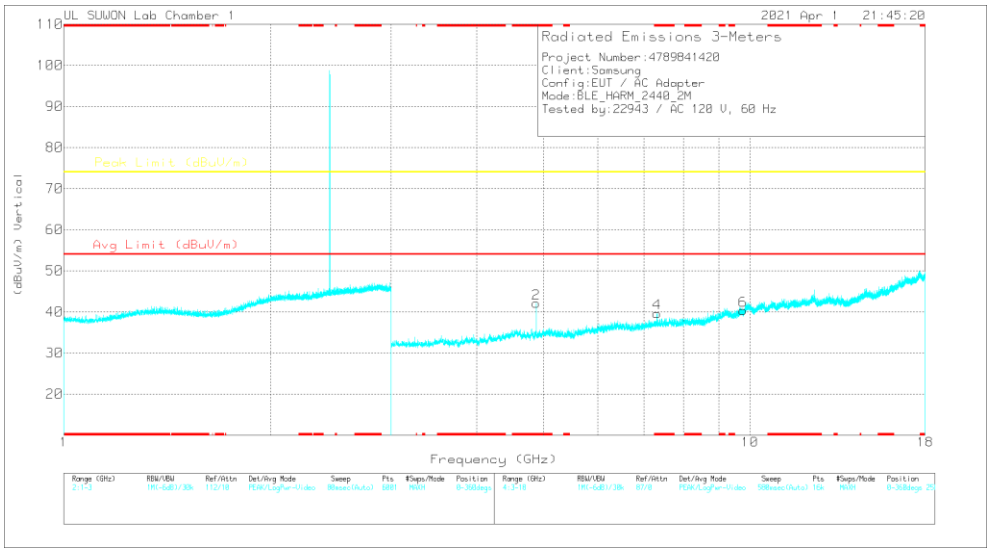
MID CHANNEL RESULTS



HORIZONTAL



VERTICAL

Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_0016871 7	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.8791	42.96	PK2	34.1	-31.4	0	45.66	-	-	74	-28.34	71	113	H
* 4.87906	31.34	MAv1	34.1	-31.4	2.38	36.42	54	-17.58	-	-	71	113	H
* 4.8812	47.22	PK2	34.1	-31.3	0	50.02	-	-	74	-23.98	150	286	V
* 4.88088	36.41	MAv1	34.1	-31.3	2.38	41.59	54	-12.41	-	-	150	286	V
* 7.31806	38.85	PK2	35.8	-27.4	0	47.25	-	-	74	-26.75	59	128	H
* 7.31318	26.08	MAv1	35.8	-27.4	2.38	36.86	54	-17.14	-	-	59	128	H
* 7.31846	39.62	PK2	35.8	-27.4	0	48.02	-	-	74	-25.98	68	170	V
* 7.31846	27.52	MAv1	35.8	-27.4	2.38	38.3	54	-15.7	-	-	68	170	V
9.75822	34.72	PK2	37.4	-23.7	0	48.42	-	-	74	-25.58	0	100	H
9.75629	34.85	PK2	37.4	-23.7	0	48.55	-	-	74	-25.45	0	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK2 - KDB558074 Method: Maximum Peak

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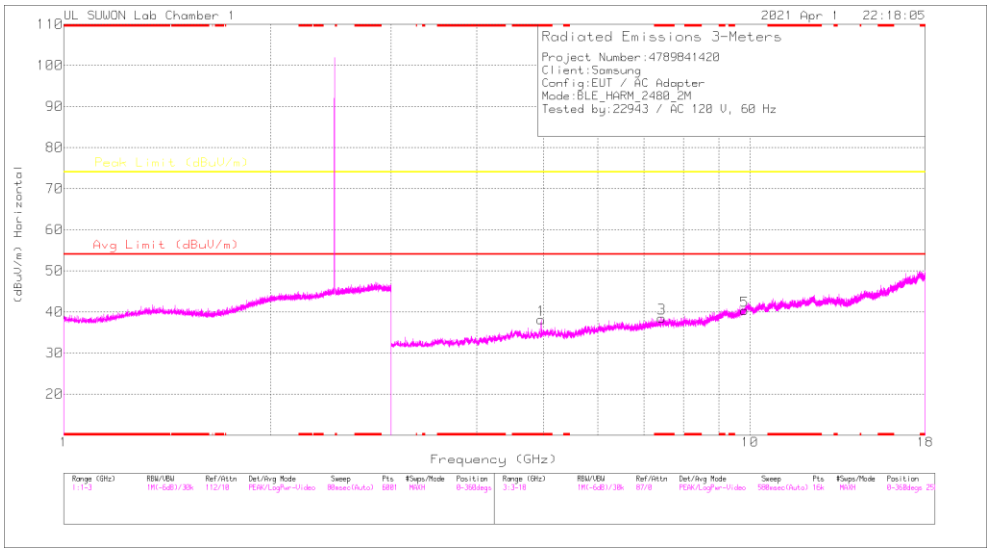
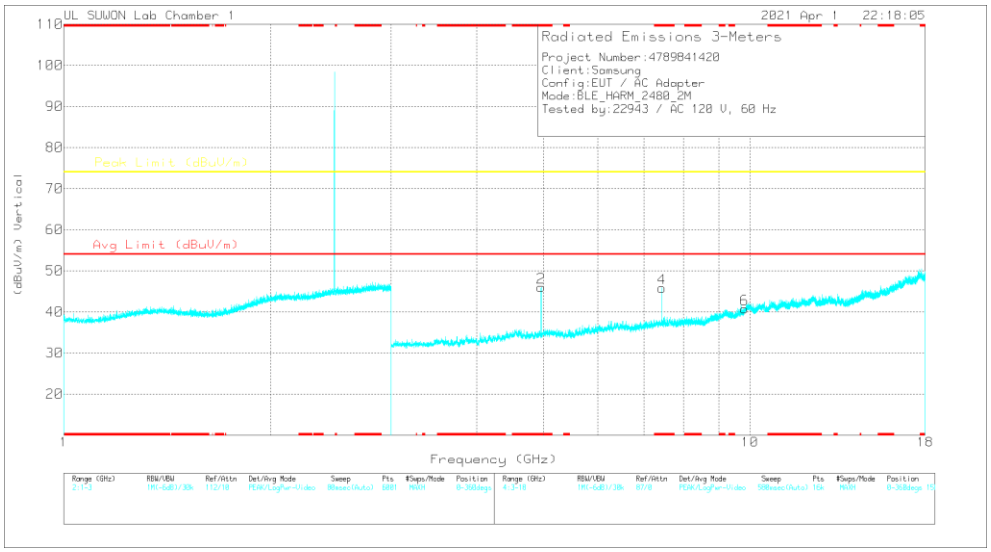
HIGH CHANNEL RESULTS



HORIZONTAL



VERTICAL

Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_0016871 7	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.95904	46.67	PK2	34.1	-31.4	0	49.37	-	-	74	-24.63	174	397	H
* 4.96086	36.57	MAv1	34.1	-31.5	2.38	41.55	54	-12.45	-	-	174	397	H
* 4.95892	47.49	PK2	34.1	-31.4	0	50.19	-	-	74	-23.81	153	167	V
* 4.95908	37.53	MAv1	34.1	-31.4	2.38	42.61	54	-11.39	-	-	153	167	V
* 7.44154	40.51	PK2	35.8	-26.9	0	49.41	-	-	74	-24.59	193	287	H
* 7.44118	28.34	MAv1	35.8	-26.9	2.38	39.62	54	-14.38	-	-	193	287	H
* 7.44154	42.66	PK2	35.8	-26.9	0	51.56	-	-	74	-22.44	94	315	V
* 7.44118	31.68	MAv1	35.8	-26.9	2.38	42.96	54	-11.04	-	-	94	315	V
9.91902	34.32	PK2	37.7	-21.6	0	50.42	-	-	74	-23.58	360	100	H
9.91529	34.06	PK2	37.7	-21.6	0	50.16	-	-	74	-23.84	360	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK2 - KDB558074 Method: Maximum Peak

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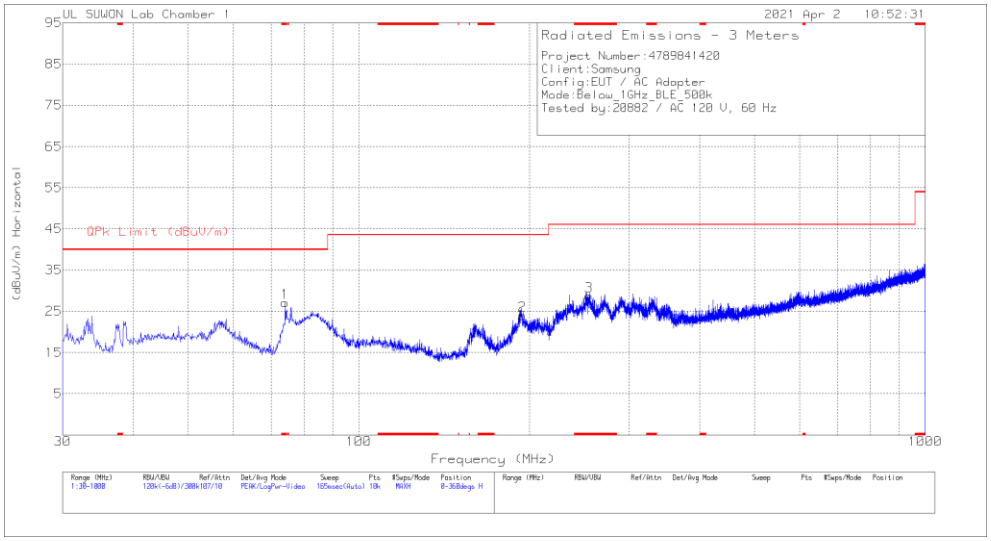
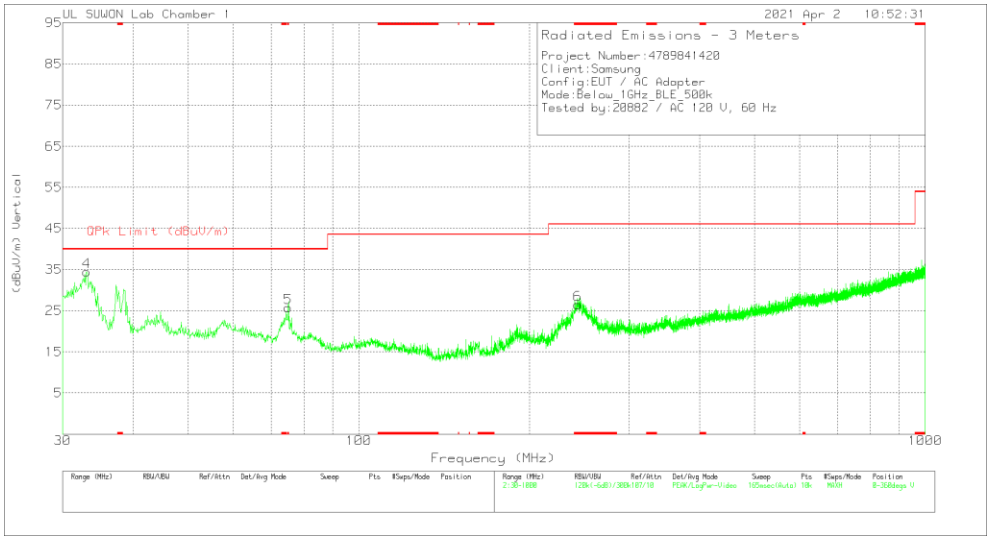
10.3. WORST CASE BELOW 1 GHZ

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION)



HORIZONTAL



VERTICAL

Below 1GHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	VULB9163_750	Below_1G[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 74.135	43.42	Pk	13.7	-30	0	27.12	40	-12.88	0-360	400	H
2	194.512	35.23	Pk	17.3	-28.5	0	24.03	43.52	-19.49	0-360	100	H
3	* 254.846	38.19	Pk	18.5	-28	0	28.69	46.02	-17.33	0-360	100	H
4	33.104	49.62	Pk	15.8	-31	0	34.42	40	-5.58	0-360	100	V
5	* 75.008	42.21	Pk	13.4	-29.9	0	25.71	40	-14.29	0-360	200	V
6	* 243.594	36.31	Pk	18.3	-28.1	0	26.51	46.02	-19.51	0-360	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector

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11. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 8.8

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.10.

The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

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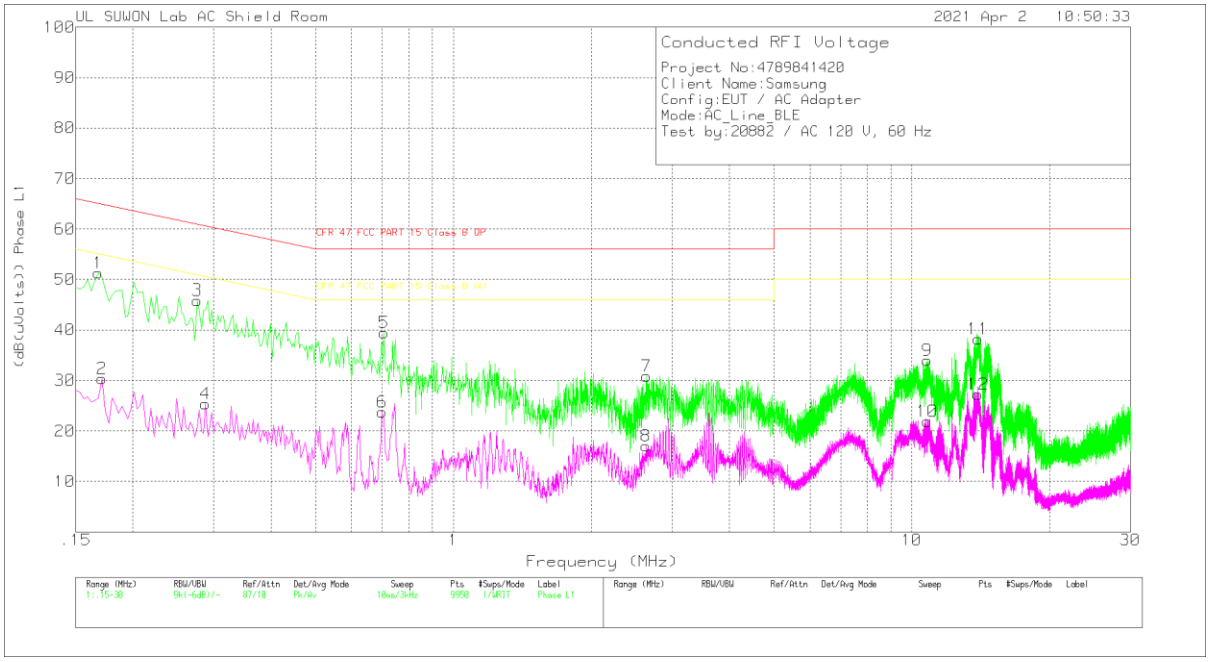
11.1.1. AC Power Line

LINE 1 RESULTS



Trace Markers

Range 1: Phase L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101836_With EX_L1[dB]	CABLELOSS(dB)	Corrected Reading (dB(uVolts))	CFR 47 FCC PART 15 Class B QP	Margin (dB)	CFR 47 FCC PART 15 Class B AV	Margin (dB)
1	.168	41.15	Pk	10	.1	51.25	65.06	-13.81	-	-
2	.171	20.15	Av	10	.2	30.35	-	-	54.91	-24.56
3	.276	35.98	Pk	9.7	.2	45.88	60.94	-15.06	-	-
4	.288	15.44	Av	9.7	.2	25.34	-	-	50.58	-25.24
5	.705	29.4	Pk	9.9	.2	39.5	56	-16.5	-	-
6	.699	13.71	Av	9.9	.2	23.81	-	-	46	-22.19
7	2.64	20.84	Pk	9.7	.3	30.84	56	-25.16	-	-
8	2.628	7.01	Av	9.7	.3	17.01	-	-	46	-28.99
9	10.818	23.8	Pk	9.9	.3	34	60	-26	-	-
10	10.806	11.74	Av	9.9	.3	21.94	-	-	50	-28.06
11	13.971	27.85	Pk	10	.4	38.25	60	-21.75	-	-
12	13.95	16.85	Av	10	.4	27.25	-	-	50	-22.75

Pk - Peak detector

Av - Average detection

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C(04)
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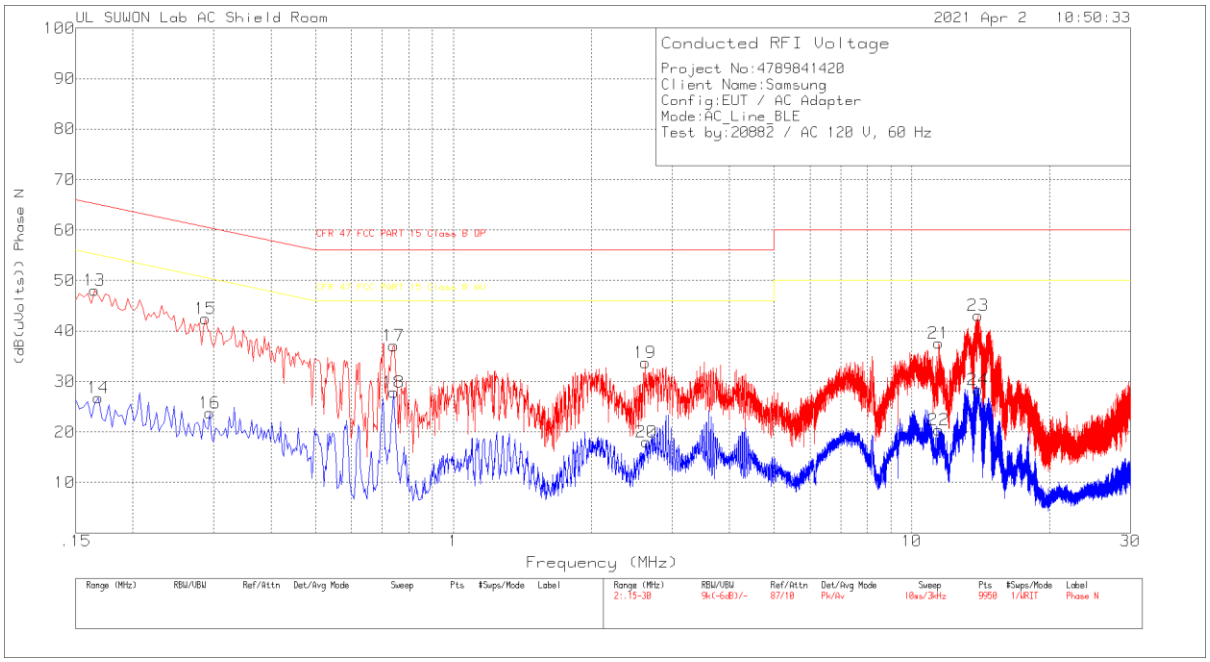
LINE 2 RESULTS



Trace Markers

Range 2: Phase N .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101836_With EX_N[dB]	CABLELOSS(dB)	Corrected Reading (dB(uVolts))	CFR 47 FCC PART 15 Class B QP	Margin (dB)	CFR 47 FCC PART 15 Class B AV	Margin (dB)
13	.165	37.97	Pk	10	.1	48.07	65.21	-17.14	-	-
14	.168	16.6	Av	10.1	.1	26.8	-	-	55.06	-28.26
15	.288	32.54	Pk	9.7	.2	42.44	60.58	-18.14	-	-
16	.294	13.88	Av	9.7	.2	23.78	-	-	50.41	-26.63
17	.741	26.94	Pk	9.9	.2	37.04	56	-18.96	-	-
18	.741	17.72	Av	9.9	.2	27.82	-	-	46	-18.18
19	2.619	23.62	Pk	9.8	.3	33.72	56	-22.28	-	-
20	2.637	7.89	Av	9.8	.3	17.99	-	-	46	-28.01
21	11.448	27.25	Pk	10	.3	37.55	60	-22.45	-	-
22	11.463	10.07	Av	10	.3	20.37	-	-	50	-29.63
23	13.947	32.6	Pk	10.1	.4	43.1	60	-16.9	-	-
24	13.959	17.85	Av	10.1	.4	28.35	-	-	50	-21.65

Pk - Peak detector

Av - Average detection

END OF TEST REPORT

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