



TEST REPORT

Report Number. : R14176139-E9V2

Applicant : Sony Corporation
1-7-1 Konan Minato-ku
Tokyo, 108-0076, Japan

FCC ID : PY7-83262V

EUT Description : GSM/WCDMA/LTE Phone with BT, DTS/UNII a/b/g/n/ac/ax, GPS, WPT & NFC

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

Date Of Issue:
2022-03-25

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Revision History

Rev.	Issue Date	Revisions	Revised By
V1	2022-03-15	Initial Issue	Nikas Haydon
V2	2022-03-25	Corrected number of section 7.4. Removed ISED references from all sections.	Nikas Haydon

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Sony Corporation
1-7-1 Konan Minato-ku
Tokyo, 108-0076, Japan

EUT DESCRIPTION: GSM/WCDMA/LTE Phone with BT, DTS/UNII a/b/g/n/ac/ax, GPS, WPT & NFC

SERIAL NUMBER: QV77008XB8, QV77009LB8, QV7700EAB8

SAMPLE RECEIPT DATE: 2022-02-10

DATE TESTED: 2022-02-24 to 2022-03-04

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 15 SUBPART C	Complies

UL LLC tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

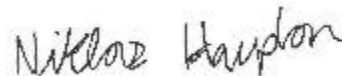
This document may not be altered or revised in any way unless done so by UL LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by A2LA, NIST, any agency of the Federal Government, or any agency of the U.S. government.

Approved & Released For
UL LLC. By:

Prepared By:



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Staff Engineer
Consumer Technology Division
UL LLC.



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Operations Leader
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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2013, FCC CFR 47 Part 2, and FCC CFR 47 Part 15.

3. FACILITIES AND ACCREDITATION

UL LLC is accredited by A2LA, certification # 0751.06, for all testing performed within the scope of this report. Testing was performed at the locations noted below.

	Address	ISED CABID	ISED Company Number	FCC Registration
☐	Building: 12 Laboratory Dr RTP, NC 27709, U.S.A	US0067	2180C	825374
☒	Building: 2800 Perimeter Park Dr. Suite B Morrisville, NC 27560, U.S.A		27265	

4. DECISION RULES AND MEASUREMENT UNCERTAINTY

4.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

4.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	U _{Lab}
Radio Frequency (Spectrum Analyzer)	141.2 Hz
Occupied Channel Bandwidth	1.22%
RF output power, conducted	1.3 dB (PK) 0.45 dB (AV)
Power Spectral Density, conducted	2.47 dB
Unwanted Emissions, conducted	1.94 dB
All emissions, radiated	6.01 dB
Conducted Emissions (0.150-30MHz) - LISN	3.40 dB
Temperature	0.57°C
Humidity	3.39%
DC Supply voltages	1.70%

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

4.4. SAMPLE CALCULATION

RADIATED EMISSIONS

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)

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

MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:

Final Voltage (dBuV) = Measured Voltage (dBuV) + Cable Loss (dB) + Limiter Factor (dB) + LISN Insertion Loss.

36.5 dBuV + 0 dB + 10.1 dB + 0 dB = 46.6 dBuV

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a GSM/WCDMA/LTE Phone with BT, DTS/UNII a/b/g/n/ac/ax, GPS, WPT & NFC. This test report covers NFC testing.

5.2. MAXIMUM ELECTRIC FIELD STRENGTH

Testing was performed at a distance of 3m. The transmitter has a maximum peak radiated magnetic field strength as follows:

The maximum E-field reading at 30m is 16.36dBuV/m.

5.3. SOFTWARE AND FIRMWARE

The software version used during testing was 0.493.

5.4. WORST-CASE CONFIGURATION AND MODE

The fundamental of the EUT was investigated under three orthogonal orientations X (Flatbed), Y (Landscape), and Z (Portrait). The Z (Portrait) orientation was determined to be the worst-case orientation.

In addition, Type A, B, F, and V at each supported data rate and with a tag were investigated to determine the worst case based on the highest power and spurious emissions. Type A, 848Kbps was determined to be the worst case and therefore Type A, 848Kbps was selected for all final tests.

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

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Headphones	Sony	MDR-EX15AP	NA	NA
USB Cable	Sony	XQZ-UB1	NA	NA
AC Adapter	Sony	XQZ-UC1	1821W34209856	NA
NFC Tag	Hicarer	NTAG215	B091Z6NtN8	NA

I/O CABLES

I/O Cable List						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	USB	1	USB-C	Non-Shielded	<3m	Connected to power supply
2	3.5mm	1	3.5mm Audio	Non-Shielded	<1m	Connected to headphones

TEST SETUP

Test software on the EUT exercised the radio.

SETUP DIAGRAM

Please refer to R14176139-EP4 for setup diagrams.

6. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville – Chamber 2)

Equip. ID	Description	Manufacturer/Brand	Model Number	Last Cal.	Next Cal.
	0.009-30MHz				
AT0079	Active Loop Antenna	ETS-Lindgren	6502	2021-08-19	2022-08-19
	30-1000 MHz				
AT0073	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2021-08-30	2022-08-30
	Gain-Loss Chains				
C2-SAC01	Gain-loss string: 0.009-30MHz	Various	Various	2021-07-09	2022-07-09
C2-SAC02	Gain-loss string: 25-1000MHz	Various	Various	2021-07-09	2022-07-09
	Receiver & Software				
197955	Spectrum Analyzer	Rohde & Schwarz	ESW44	2021-03-10	2022-03-10
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
	Additional Equipment used				
s/n 181474409	Environmental Meter	Fisher Scientific	15-077-963	2021-09-27	2022-09-27

Test Equipment Used - Wireless Conducted Measurement Equipment

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
SA0027	Spectrum Analyzer	Keysight Technologies	N9030A	2021-06-25	2022-06-25
T177	Spectrum Analyzer	Keysight Technologies	N9030A	2021-05-19	2022-05-19
51845	Temp/Humid Chamber	Thermotron	SM-32-8200	2022-01-25	2023-01-25
MY61466084	DC Regulated Power Supply	Keysight	E3633A	NA	NA
HI0090	Environmental Meter	Fisher Scientific	15-077-963	2021-07-12	2022-07-12
MM0167	True RMS Multimeter	Agilent	U1232A	2021-08-17	2022-08-17
HI0091	Environmental Meter	Fisher Scientific	15-077-963	2021-07-12	2022-07-12

Test Equipment Used - Line-Conducted Emissions – Voltage (Morrisville – Conducted 1)

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
CBL087	Coax cable, RG223, N-male to BNC-male, 20-ft.	Pasternack	PE3W06143-240	2021-04-05	2022-04-05
HI0091	Environmental Meter	Fisher Scientific	15-077-963	2021-07-12	2022-07-12
LISN003	LISN, 50-ohm/50-uH, 250uH 2-conductor, 25A	Fischer Custom Com.	FCC-LISN-50/250-25-2-01	2021-08-16	2022-08-16
75141	EMI Test Receiver 9kHz-7GHz	Rohde & Schwarz	ESCI 7	2021-08-17	2022-08-17
ATA222	Transient Limiter, 0.009-100MHz	Electro-Metrics	EM-7600	2021-04-05	2022-04-05
PS214	AC Power Source	Elgar	CW2501M (s/n 1523A02396)	NA	NA
SOFTEMI	EMI Software	UL	Version 9.5 (04 Mar 2021)		
	Miscellaneous (if needed)				
CDECABLE001	ANSI C63.4 1m extension cable.	UL	Per Annex B of ANSI C63.4	2021-09-13	2022-09-13

7. 20dB BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1-5% of the 20dB bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

Note: Because the measured signal is CW-like, adjusting the RBW per C63.10 would not be practical since measured bandwidth will always follow the RBW and the result will be approximately twice the RBW.

RESULTS

Type A (CE Mode)

Mode Kbps	Frequency (MHz)	20dB Bandwidth (KHz)
848	13.56	49.19
424	13.56	1301
212	13.56	869.7
106	13.56	448.2

Type B (CE Mode)

Mode Kbps	Frequency (MHz)	20dB Bandwidth (KHz)
848	13.56	26.86
424	13.56	7.844
212	13.56	7.890
106	13.56	8.317

Type F (CE Mode)

Mode Kbps	Frequency (MHz)	20dB Bandwidth (KHz)
424	13.56	27.25
212	13.56	26.58

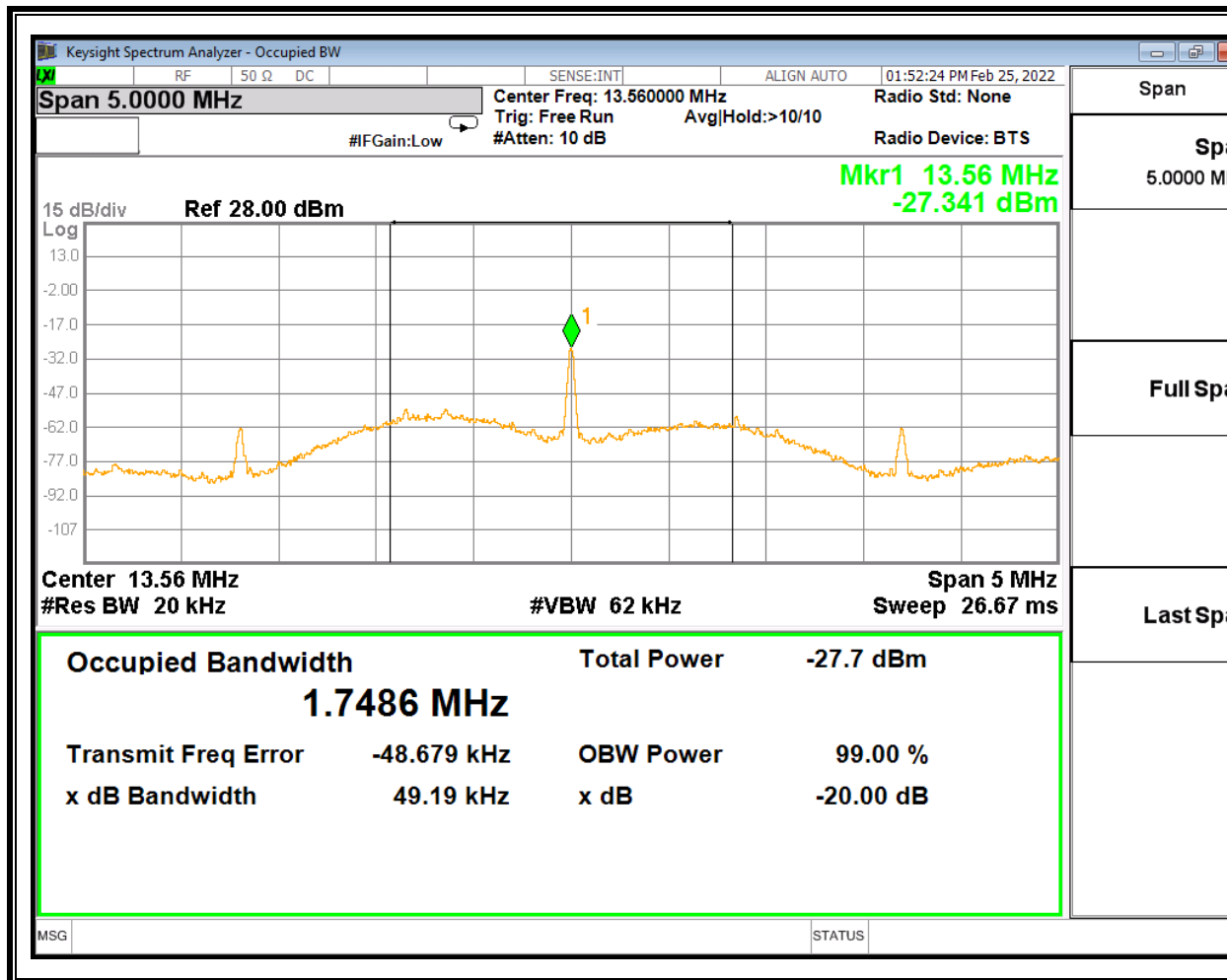
Type V (CE Mode)

Mode Kbps	Frequency (MHz)	20dB Bandwidth (KHz)
26	13.56	130.9

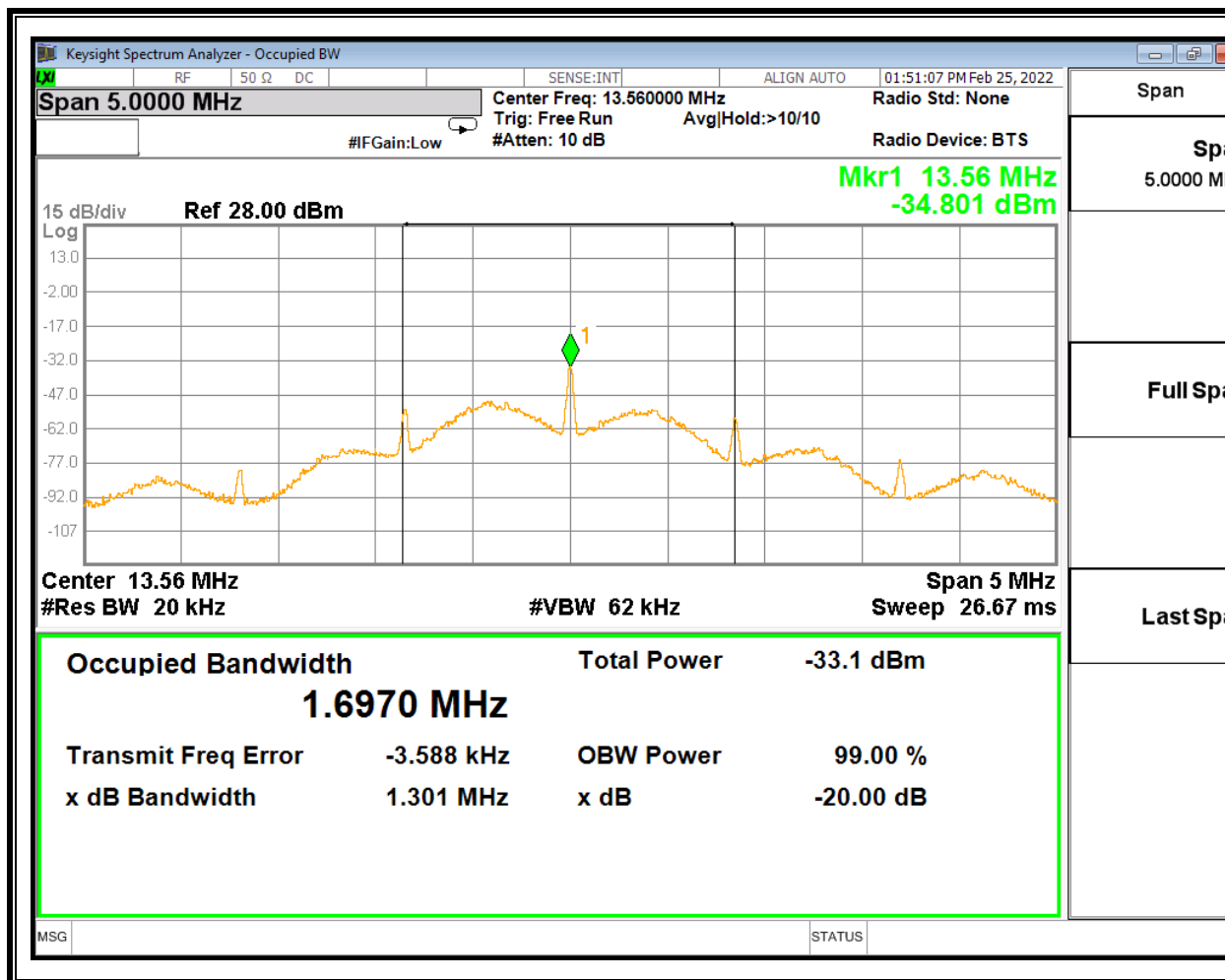
Tested by: 11993

7.1. Type A (CE Mode)

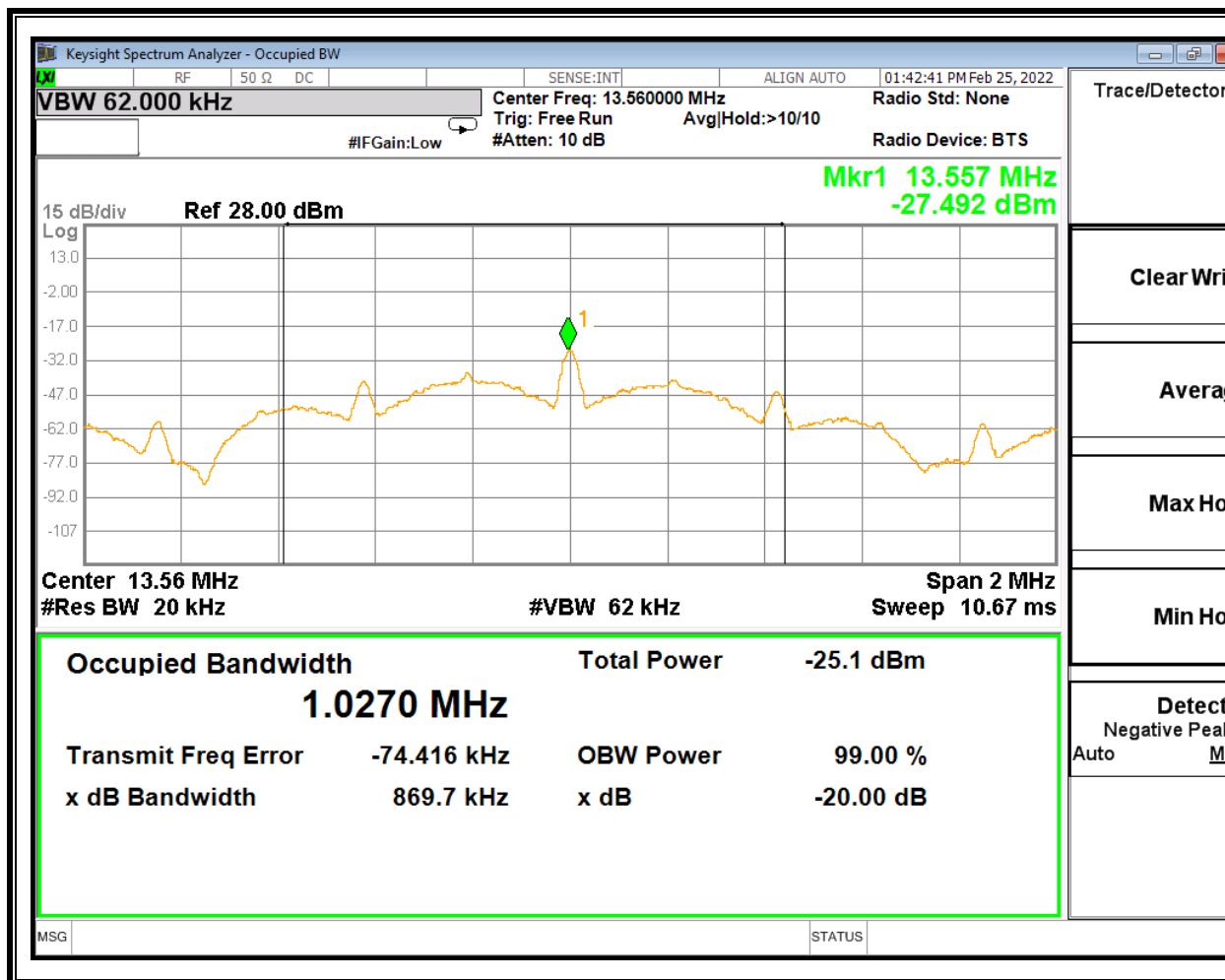
848Kbps



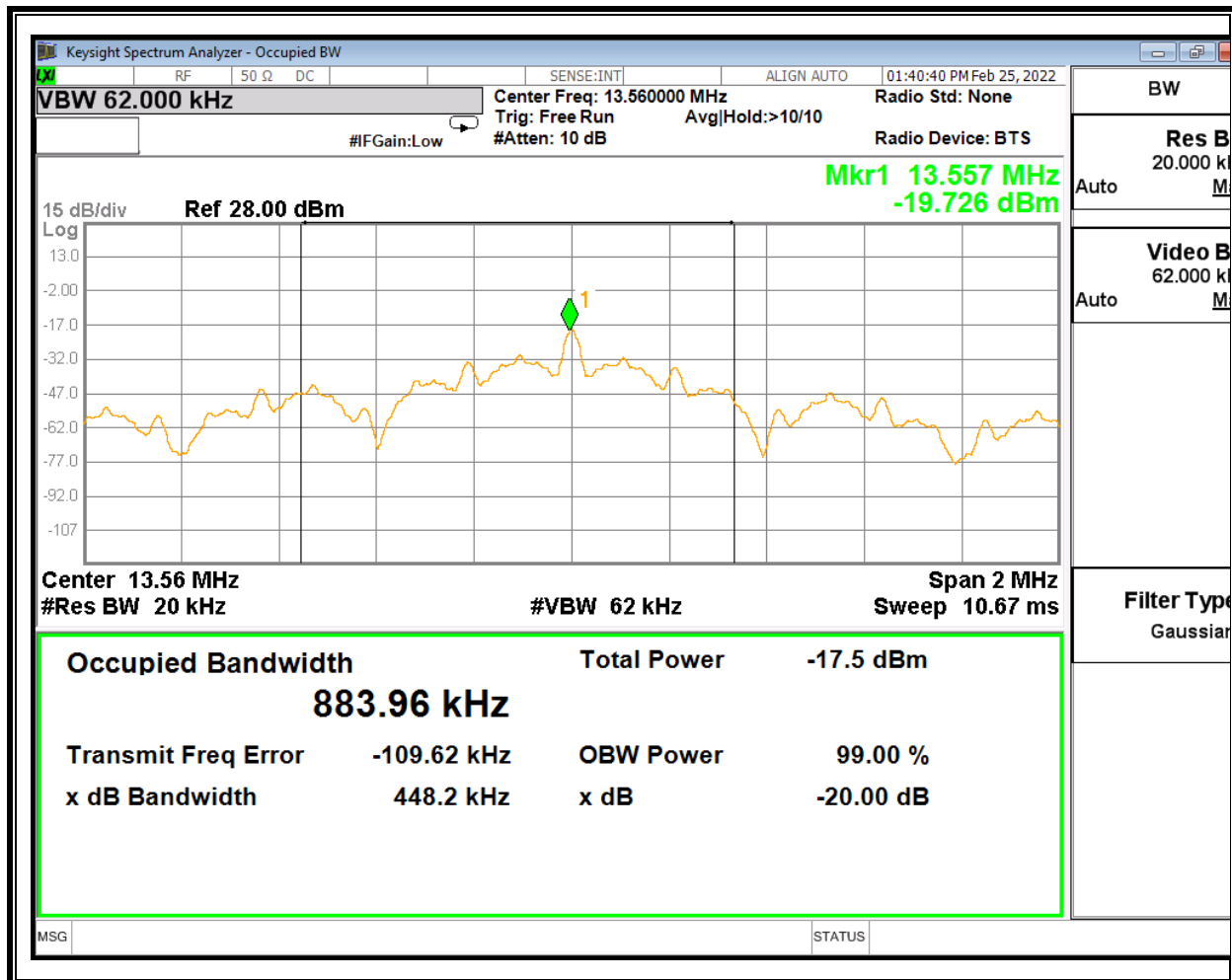
424Kbps



212Kbps

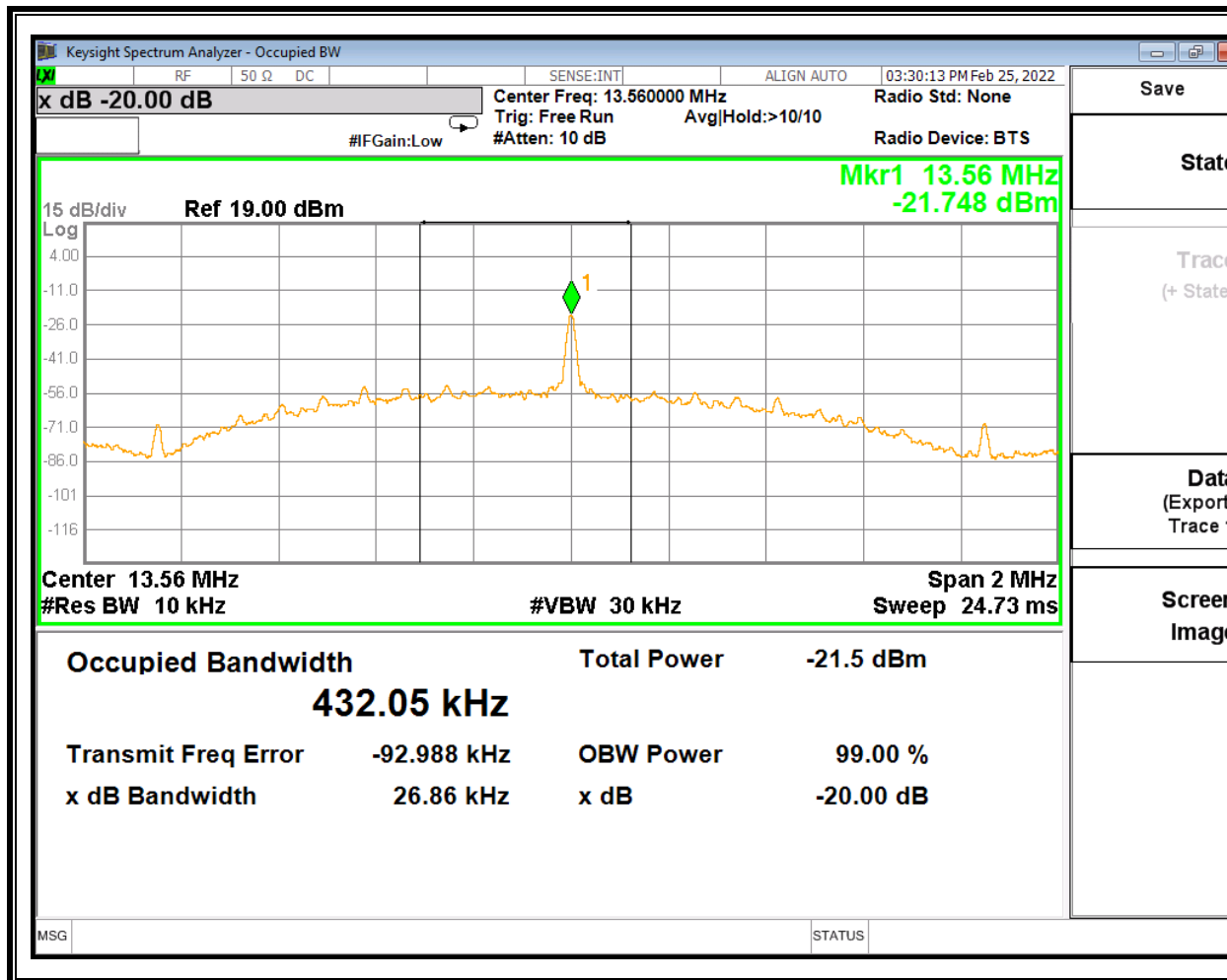


106Kbps

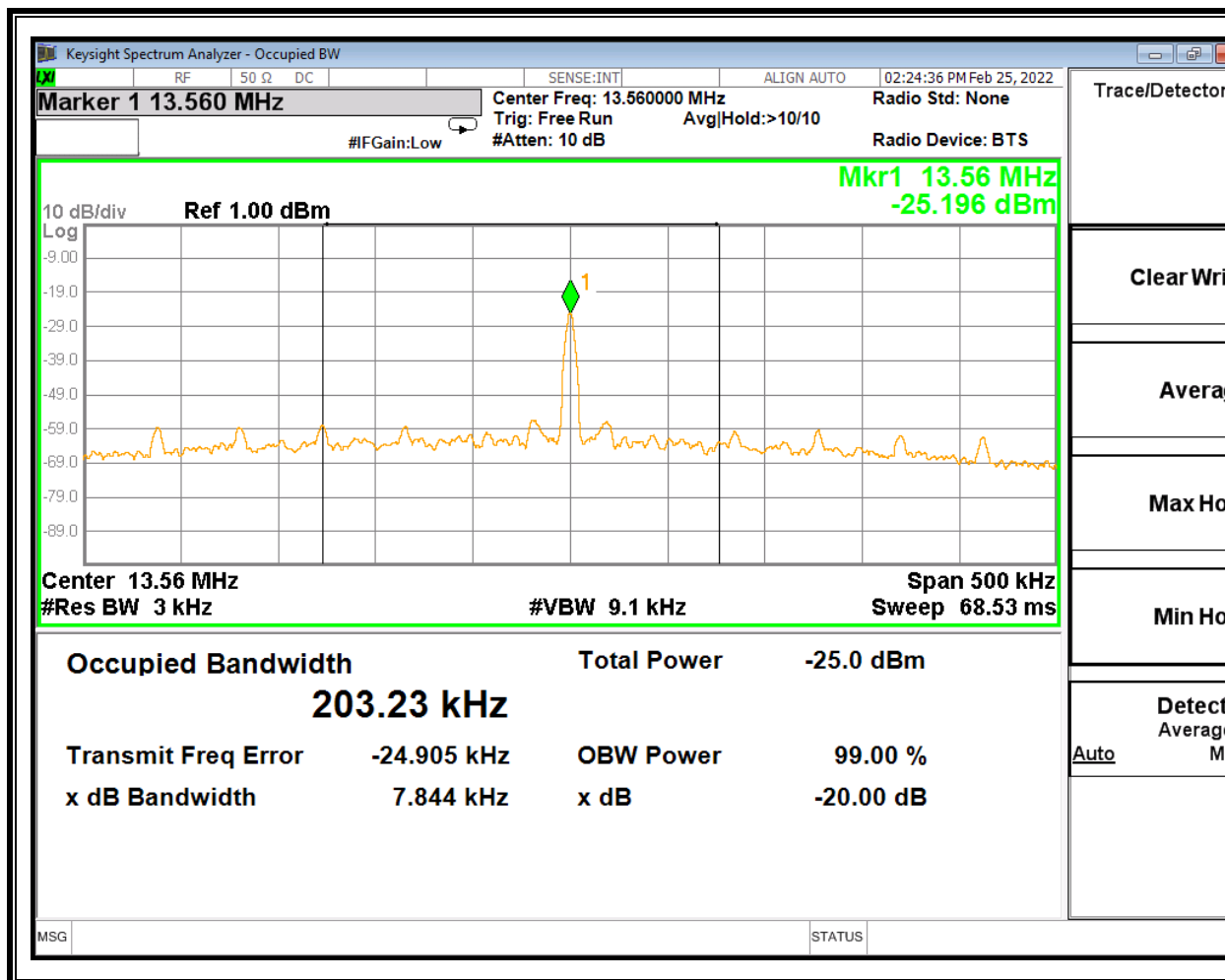


7.2. Type B (CE Mode)

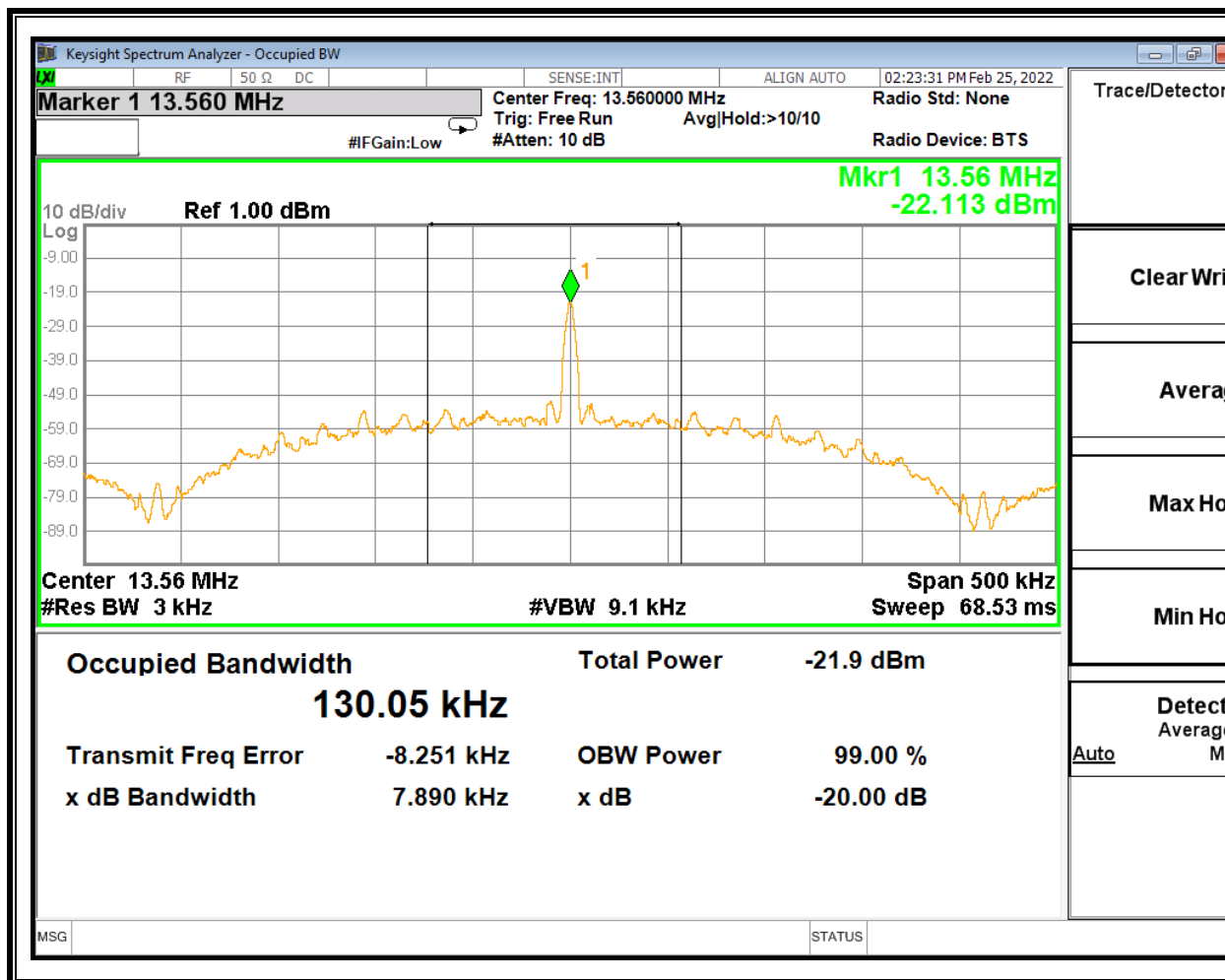
848Kbps



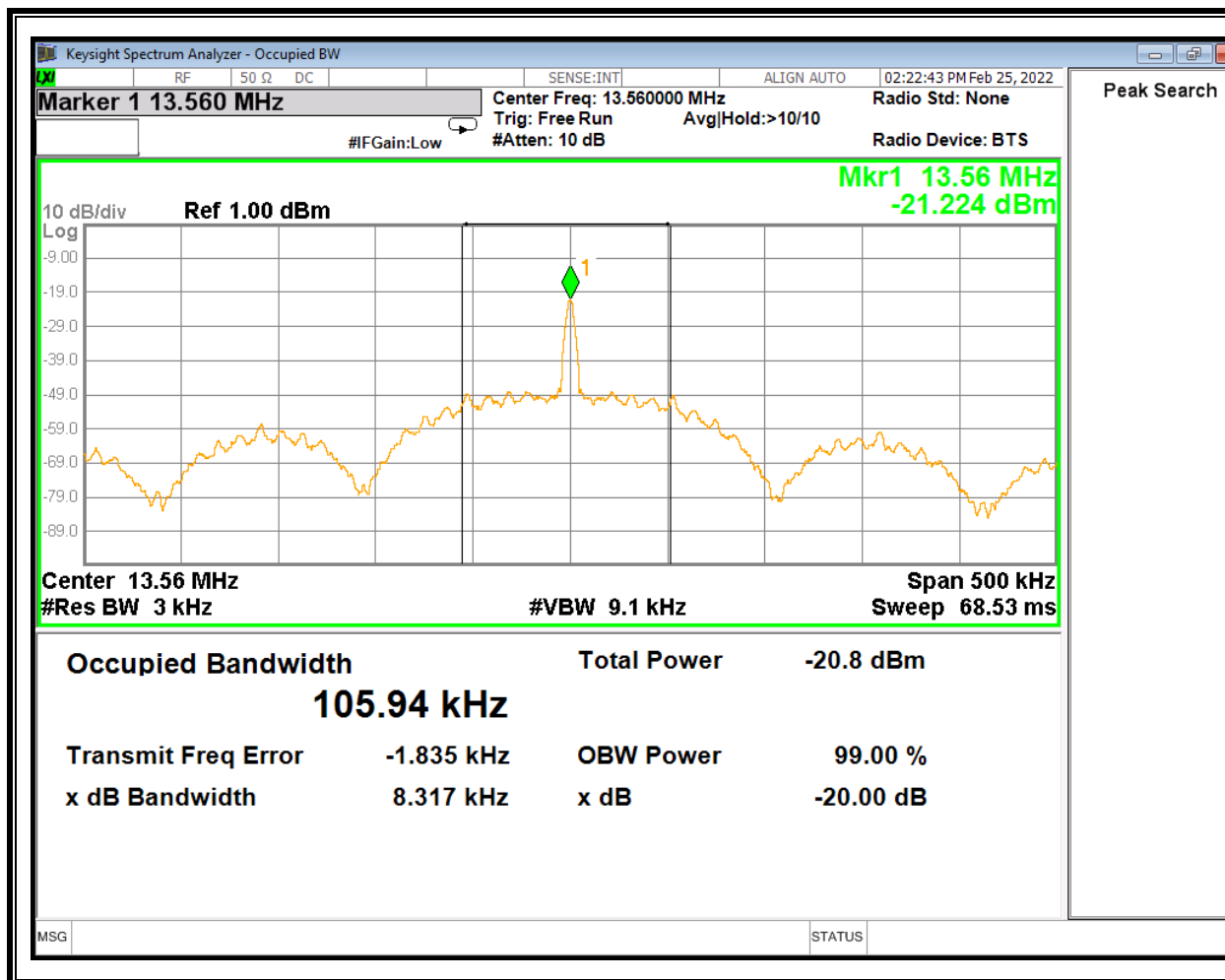
424Kbps



212Kbps

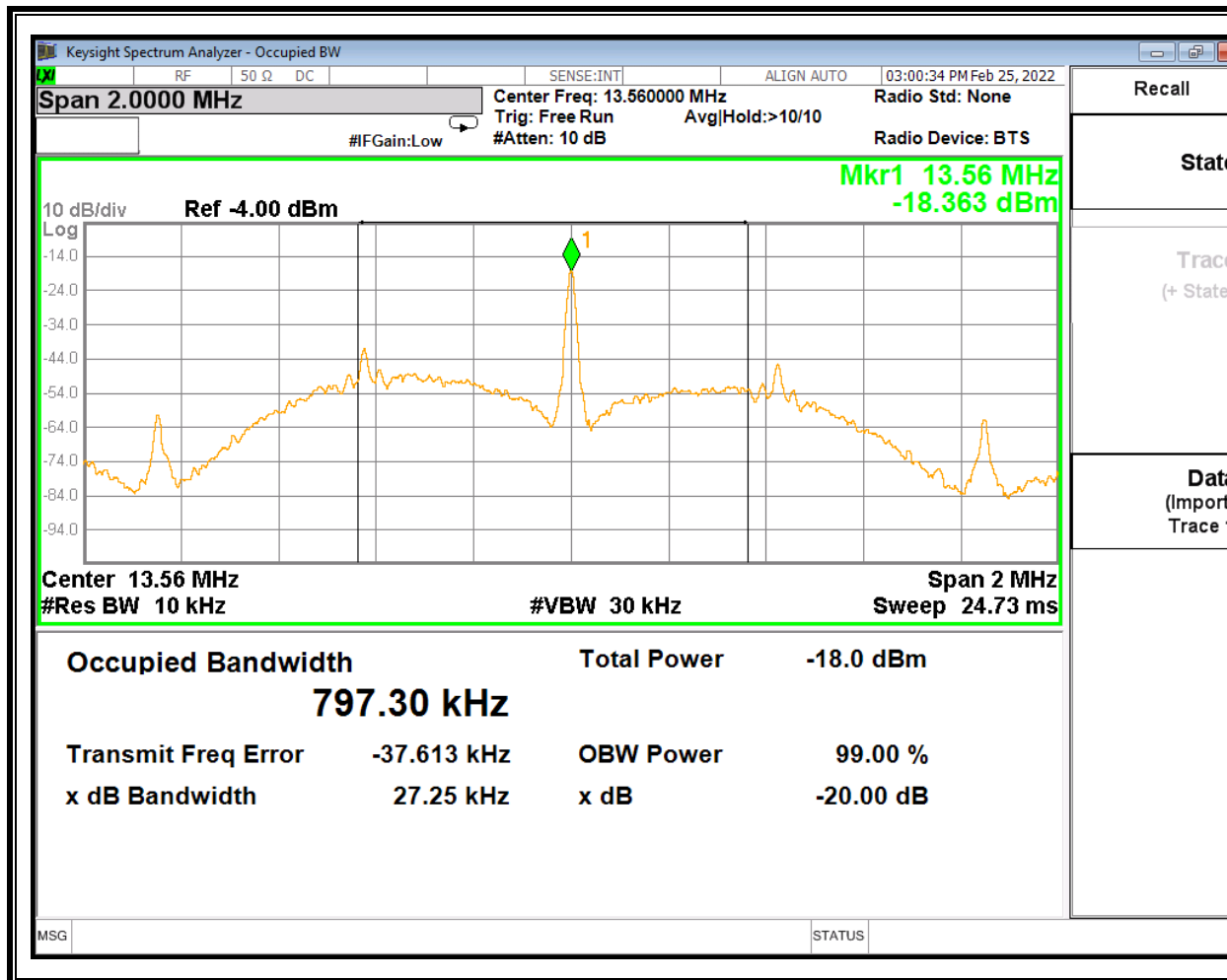


106Kbps

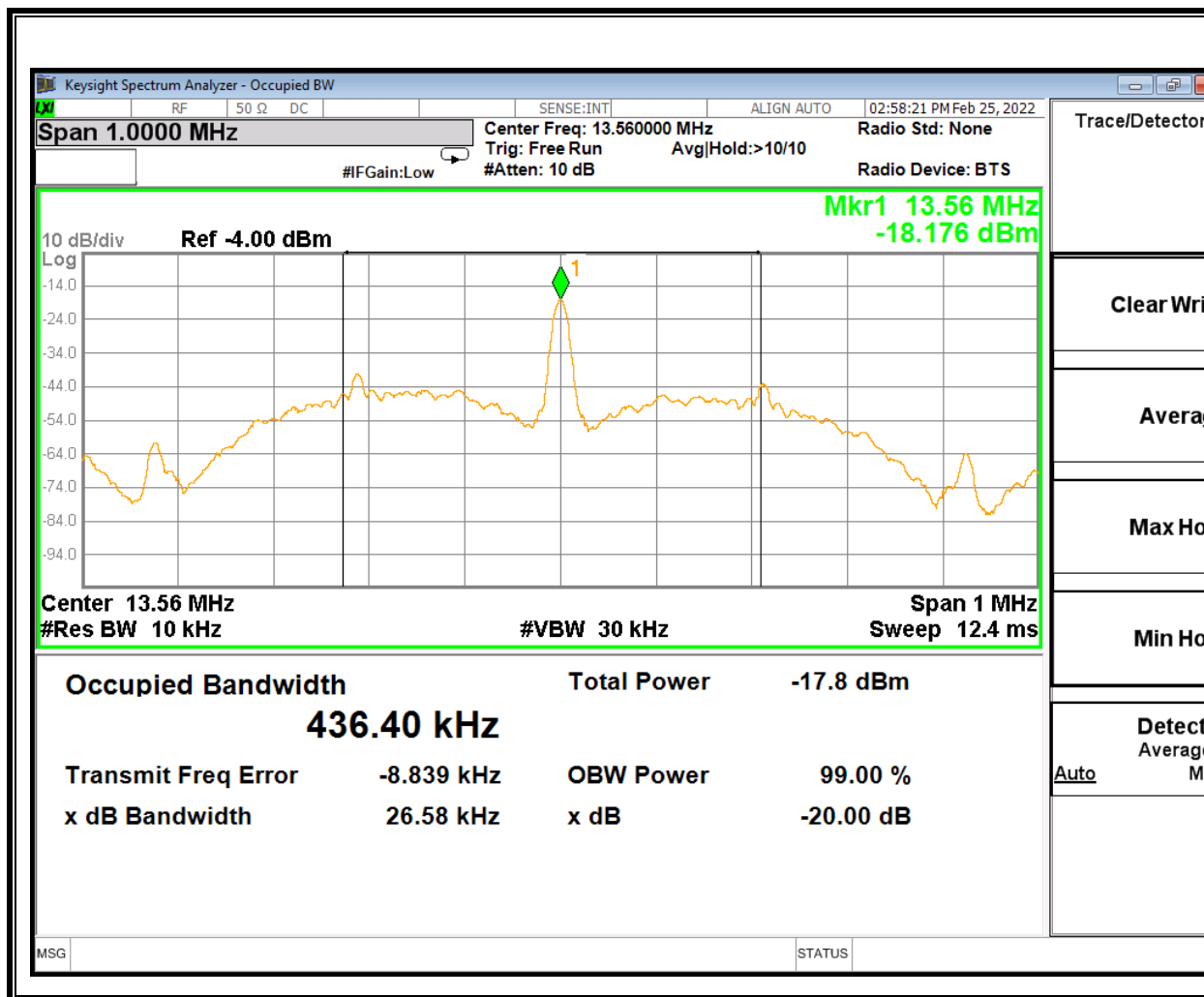


7.3. Type F (CE Mode)

424Kbps

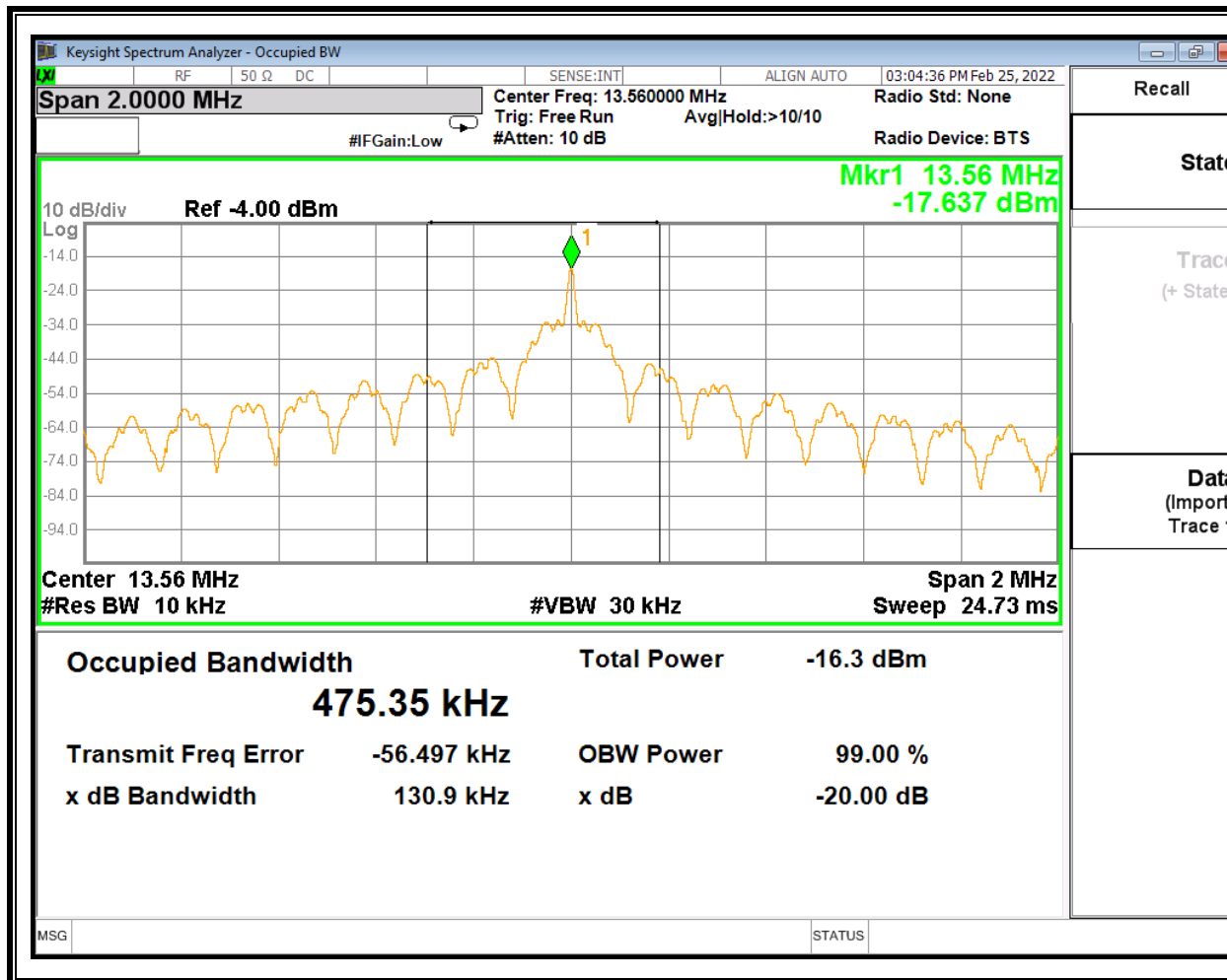


212Kbps



7.4. Type V (CE Mode)

26Kbps



8. RADIATED EMISSION TEST RESULTS

8.1. LIMITS AND PROCEDURE

LIMIT

§15.225

(a) The field strength of any emissions within the band 13.553–13.567 MHz shall not exceed 15,848 microvolts/ meter at 30 meters.

(b) Within the bands 13.410–13.553 MHz and 13.567–13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

(c) Within the bands 13.110–13.410 MHz and 13.710–14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

(d) The field strength of any emissions appearing outside of the 13.110– 14.010 MHz and shall not exceed the general radiated emission limits in § 15.209 as follows:

§15.209 (a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

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.

§15.209 (b) In the emission table above, the tighter limit applies at the band edges.

Formula for converting the filed strength from uV/m to dBuV/m is:

Limit (dBuV/m) = 20 log limit (uV/m)

§15.209 (d) The emission limits shown the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emissions limits in these three bands are based on measurements employing an average detector.

§15.209 (d) The provisions in §§ 15.225, measuring emissions at distances other than the distances specified in the above table, determining the frequency range over which radiated emissions are to be measured, and limiting peak emissions apply to all devices operated under this part.

TEST PROCEDURE

ANSI C63.10, 2013

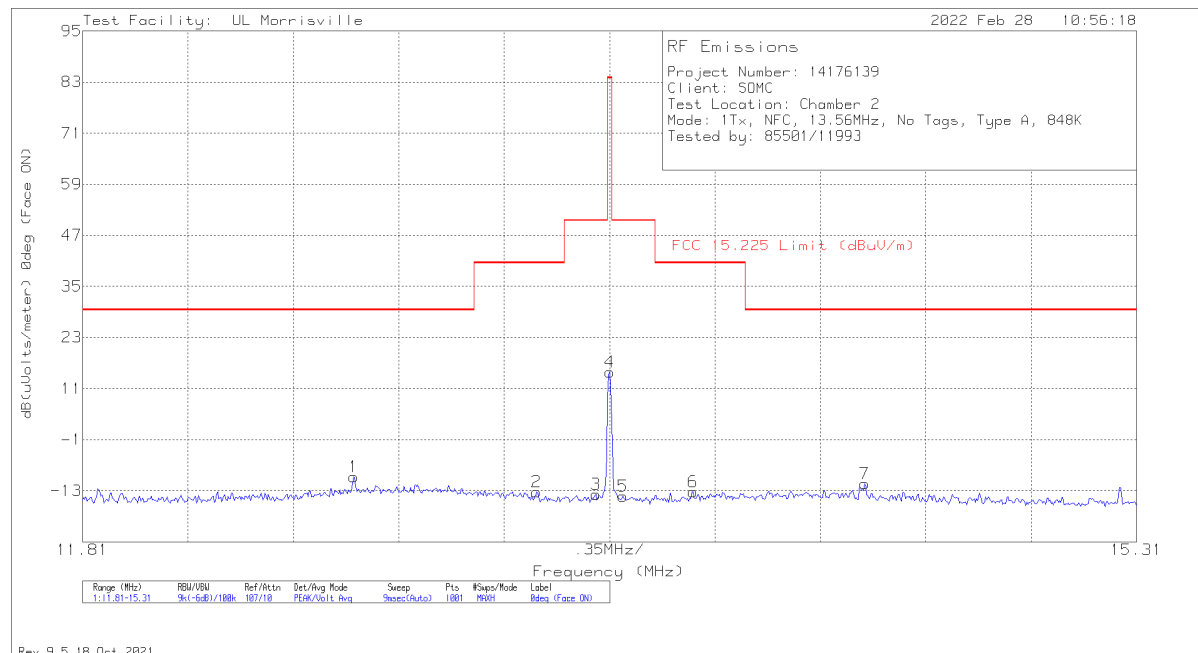
The EUT is an intentional radiator that incorporates a digital device, the highest fundamental frequency generated or used in the device is 13.56 MHz; therefore, the frequency range was investigated from 0.15 MHz to the 10th harmonic of the highest fundamental frequency, or 1000 MHz, whichever is greater.

RESULTS

8.2. FUNDAMENTAL AND SPURIOUS EMISSIONS (0.009 - 30 MHz)

8.2.1. Type A (CE Mode)

FUNDAMENTAL 848Kbps – Face On, 0 Deg

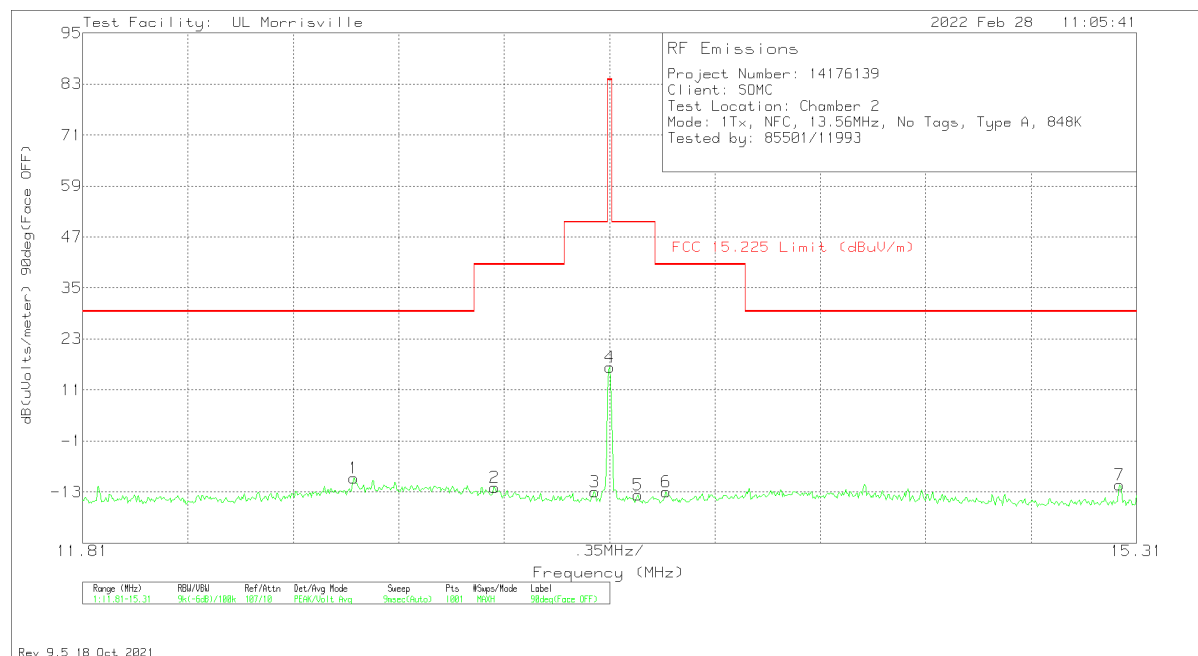


DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0079 (dB/m)	Cbl (dB)	Dist. Corr. Factor (dB)	Corrected Reading dB(uVolts/meter)	FCC 15.225 Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Loop Angle
1	12.7095	19.23	Pk	10.3	.7	-40	-9.77	29.5	-39.27	53	0 degs
2	13.3185	15.81	Pk	10.2	.7	-40	-13.29	40.5	-53.79	53	0 degs
3	13.5145	15.21	Pk	10.2	.7	-40	-13.89	50.5	-64.39	53	0 degs
4	13.56	43.91	Pk	10.2	.7	-40	14.81	84	-69.19	53	0 degs
5	13.6055	14.77	Pk	10.2	.7	-40	-14.33	50.5	-64.83	53	0 degs
6	13.8365	15.9	Pk	10.1	.7	-40	-13.3	40.5	-53.8	53	0 degs
7	14.407	17.73	Pk	10.1	.8	-40	-11.37	29.5	-40.87	53	0 degs

Pk - Peak detector

FUNDAMENTAL 848Kbps – Face Off, 90 Deg

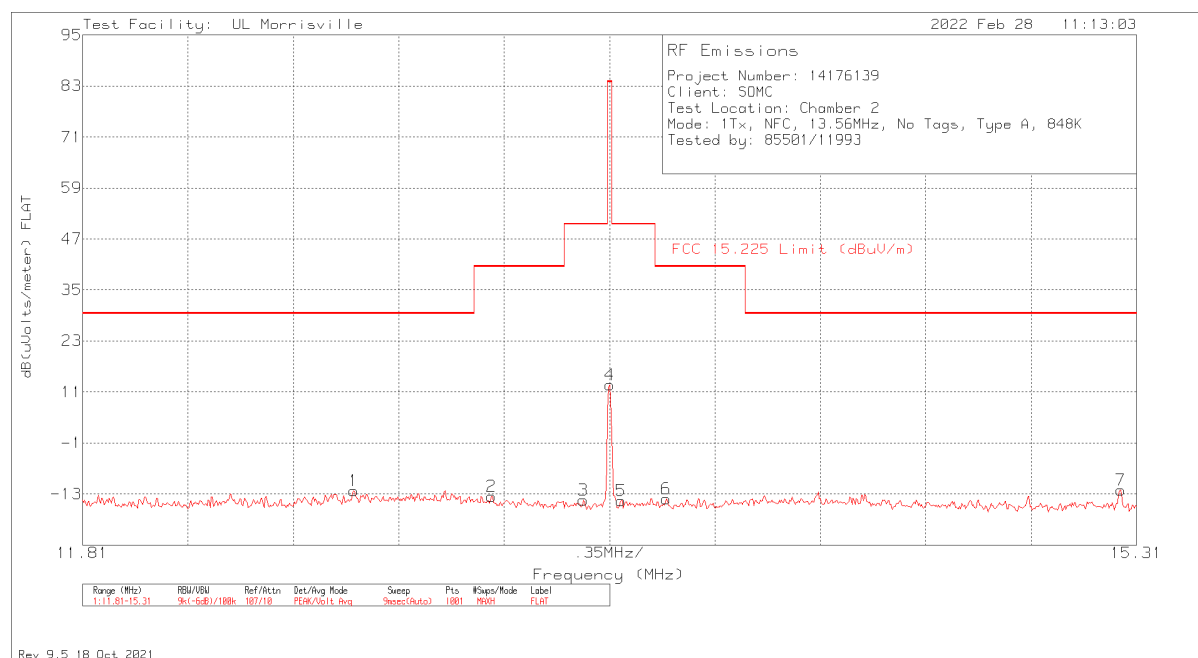


DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0079 (dB/m)	Cbl (dB)	Dist. Corr. Factor (dB)	Corrected Reading dB(uVolts/meter)	FCC 15.225 Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Loop Angle
1	12.7095	19.3	Pk	10.3	.7	-40	-9.7	29.5	-39.2	150	90 degs
2	13.1785	17.14	Pk	10.2	.7	-40	-11.96	40.5	-52.46	150	90 degs
3	13.511	16.14	Pk	10.2	.7	-40	-12.96	50.5	-63.46	150	90 degs
4	13.56	45.46	Pk	10.2	.7	-40	16.36	84	-67.64	150	90 degs
5	13.6545	15.33	Pk	10.2	.7	-40	-13.77	50.5	-64.27	150	90 degs
6	13.749	16.13	Pk	10.2	.7	-40	-12.97	40.5	-53.47	150	90 degs
7	15.254	17.81	Pk	10	.8	-40	-11.39	29.5	-40.89	150	90 degs

Pk - Peak detector

FUNDAMENTAL 848Kbps – Horizontal, Flat



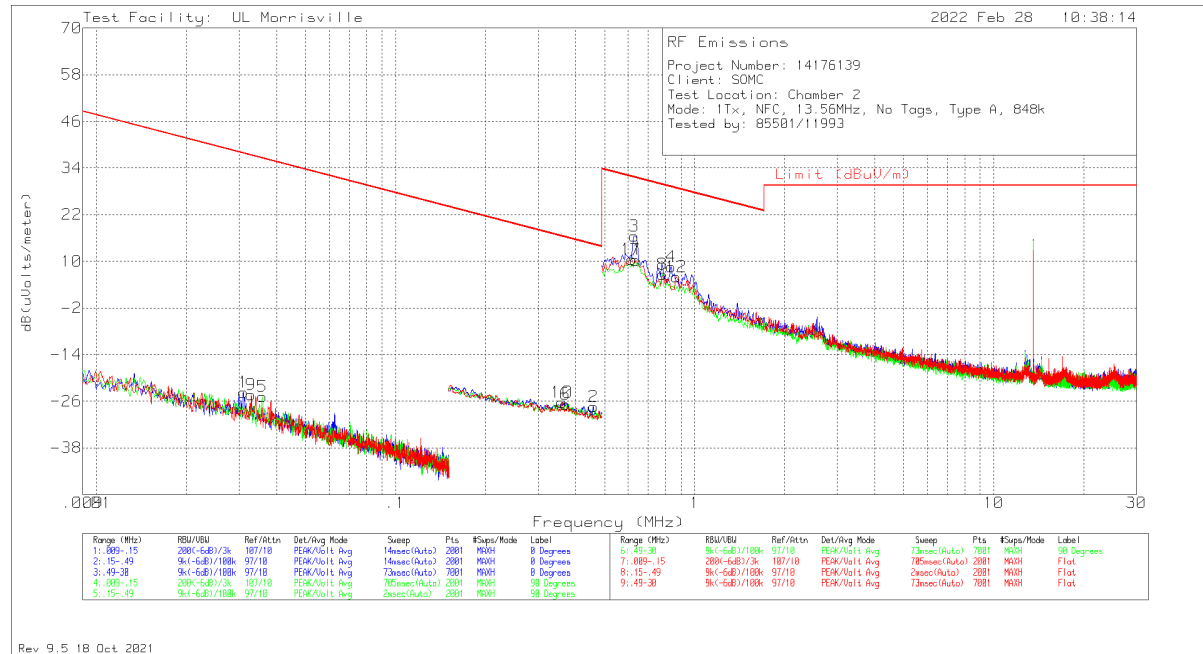
DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0079 (dB/m)	Cbl (dB)	Dist. Corr. Factor (dB)	Corrected Reading dB(uVolts/meter)	FCC 15.225 Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Loop Angle
1	12.7095	16.79	Pk	10.3	.7	-40	-12.21	29.5	-41.71	39	Flat
2	13.168	15.52	Pk	10.2	.7	-40	-13.58	40.5	-54.08	39	Flat
3	13.4725	14.69	Pk	10.2	.7	-40	-14.41	50.5	-64.91	39	Flat
4	13.56	41.82	Pk	10.2	.7	-40	12.72	84	-71.28	39	Flat
5	13.5985	14.55	Pk	10.2	.7	-40	-14.55	50.5	-65.05	39	Flat
6	13.749	14.89	Pk	10.2	.7	-40	-14.21	40.5	-54.71	39	Flat
7	15.2575	17.15	Pk	10	.8	-40	-12.05	29.5	-41.55	39	Flat

Pk - Peak detector

SPURIOUS EMISSION 848Kbps

Note: All measurements were made at a test distance of 3 m. The measured data was extrapolated from the test distance (3m) to the specification distance (300 m from 9-490 kHz and 30 m from 490 kHz – 30 MHz) to clearly show the relative levels of fundamental and spurious emissions and demonstrate compliance with the requirement that the level of any spurious emissions be below the level of the intentionally transmitted signal. The extrapolation factor for the limits were 40*Log (test distance / specification distance).



DATA

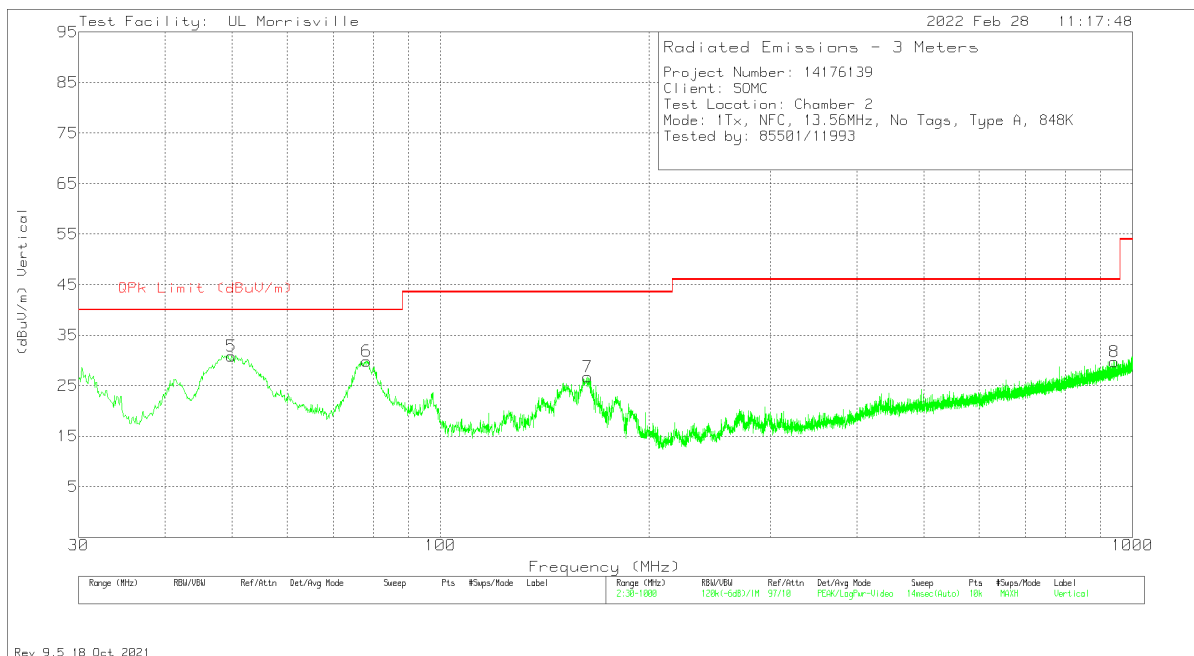
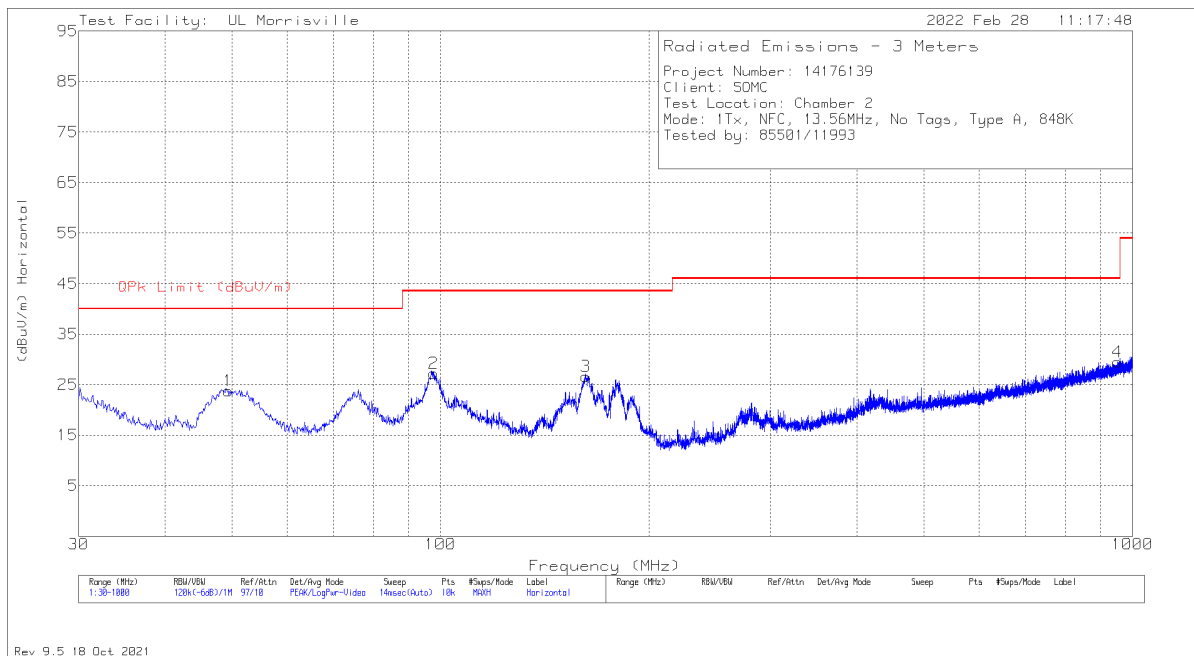
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0079 (dB/m)	Cbl (dB)	Dist. Corr. Factor (dB)	Corrected Reading dB(uVolts/meter)	QP/Avg Limit (dBuV/m)	Pk Limit (dBuV/m)	Worst-Case Margin (dB)	Azimuth (Degs)	Height (cm)	Loop Angle
1	.03101	42.93	Pk	13.3	.1	-80	-23.67	37.77	57.77	-61.44	0-360	401	0 degs
9	.03293	42.44	Pk	13.1	.1	-80	-24.36	37.25	57.25	-61.61	0-360	401	Flat
5	.03591	42.22	Pk	12.9	.1	-80	-24.78	36.5	56.5	-61.28	0-360	401	90 degs
10	.36012	42.49	Pk	11.2	.1	-80	-26.21	16.48	36.48	-42.69	0-360	401	Flat
6	.36896	42.01	Pk	11.2	.1	-80	-26.69	16.26	36.26	-42.95	0-360	401	90 degs
2	.45855	41.32	Pk	11.2	.1	-80	-27.38	14.38	34.38	-41.76	0-360	401	0 degs
11	.61648	39.15	Pk	11.2	.2	-40	10.55	31.81	-	-21.26	0-360	401	Flat
3	.62913	45.04	Pk	11.3	.2	-40	16.54	31.63	-	-15.09	0-360	401	0 degs
7	.63334	38.77	Pk	11.3	.2	-40	10.27	31.57	-	-21.3	0-360	401	90 degs
8	.7788	35.19	Pk	11.3	.2	-40	6.69	29.78	-	-23.09	0-360	401	90 degs
4	.83571	37.11	Pk	11.3	.2	-40	8.61	29.16	-	-20.55	0-360	401	0 degs
12	.86944	34.47	Pk	11.3	.2	-40	5.97	28.82	-	-22.85	0-360	401	Flat

Pk - Peak detector

8.3. TX SPURIOUS EMISSION 30 TO 1000 MHz

8.3.1. Type A (CE Mode)

SPURIOUS EMISSION 848Kbps



DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0073 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	49.303	40.85	Pk	14.2	-31.3	23.75	40	-16.25	0-360	399	H
5	49.885	48.16	Pk	13.9	-31.2	30.86	40	-9.14	0-360	101	V
6	78.209	46.78	Pk	13.8	-30.7	29.88	40	-10.12	0-360	101	V
2	97.706	42.1	Pk	15.7	-30.5	27.3	43.52	-16.22	0-360	299	H
3	162.308	38.23	Pk	18.3	-29.9	26.63	43.52	-16.89	0-360	199	H
7	163.278	38.29	Pk	18.3	-29.8	26.79	43.52	-16.73	0-360	101	V
8	940.539	25.78	Pk	28.8	-24.8	29.78	46.02	-16.24	0-360	101	V
4	950.627	25.52	Pk	28.9	-24.9	29.52	46.02	-16.5	0-360	299	H

Pk - Peak detector

9. FREQUENCY STABILITY

LIMIT

§15.225 (e) The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency, over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from the minimum to the maximum of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

TEST PROCEDURE

ANSI C63.10-2013 Clause 6.8

RESULTS

No non-compliance noted.

9.1. Type A

9.1.1. CE Mode

848Kbps

Reference Frequency: EUT Channel 13.56 MHz @ 20°C Limit: ± 100 ppm = 1.356 kHz										
Power Supply	Envir. Temp	Frequency Deviation Measured with Time Elapse								
(Vdc)	(°C)	Startup (MHz)	Delta (ppm)	@ 2 mins (MHz)	Delta (ppm)	@ 5 mins (MHz)	Delta (ppm)	@ 10 mins (MHz)	Delta (ppm)	Limit (ppm)
3.89	50	13.5599823	0.734	13.5599728	1.437	13.5599893	0.221	13.5599681	1.783	± 100
3.89	40	13.5600000	-0.564	13.5599986	-0.465	13.5599994	-0.526	13.5599988	-0.478	± 100
3.89	30	13.5599987	-0.470	13.5599785	1.016	13.5599982	-0.437	13.5599993	-0.517	± 100
3.89	20	13.5599923	0.000	13.5599963	-0.298	13.5599991	-0.503	13.5599992	-0.510	± 100
3.89	10	13.5599836	0.641	13.5599834	0.654	13.5599831	0.679	13.5599831	0.679	± 100
3.89	0	13.5599951	-0.206	13.5599950	-0.199	13.5599950	-0.198	13.5599947	-0.180	± 100
3.89	-10	13.5599993	-0.519	13.5599994	-0.525	13.5599994	-0.523	13.5599995	-0.528	± 100
3.89	-20	13.5599995	-0.528	13.5599995	-0.532	13.5599995	-0.532	13.5599997	-0.544	± 100
3.69	20	13.5599945	-0.165	13.5599983	-0.439	13.5599985	-0.460	13.5599961	-0.281	± 100
4.28	20	13.5599585	2.493	13.5599898	0.185	13.5599747	1.298	13.5599999	-0.557	± 100

Tested by: 40882

Test date: 2022-03-04

10. AC MAINS LINE CONDUCTED EMISSIONS

LIMITS

§15.207

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the band edges.

Frequency range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Notes:
1. The lower limit shall apply at the transition frequencies
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

TEST PROCEDURE

ANSI C63.10:2013

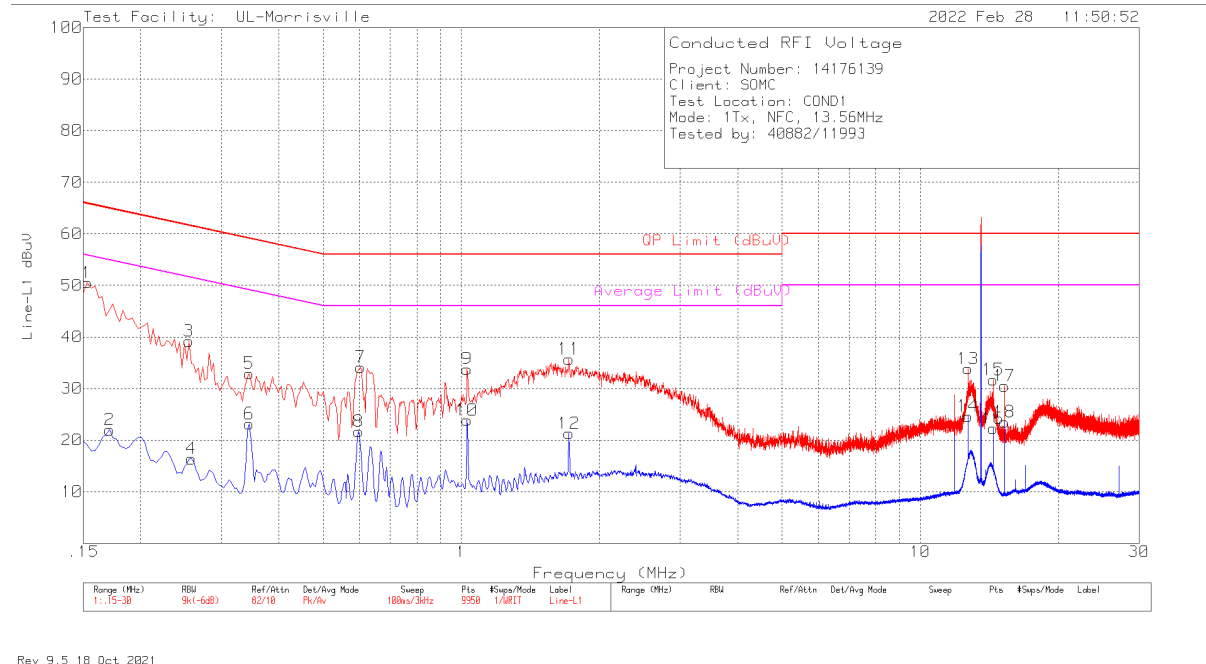
RESULTS

No non-compliance noted:

10.1. Type A (CE Mode)

10.1.1. NORMAL OPERATION, 848Kbps

LINE 1 RESULTS



DATA

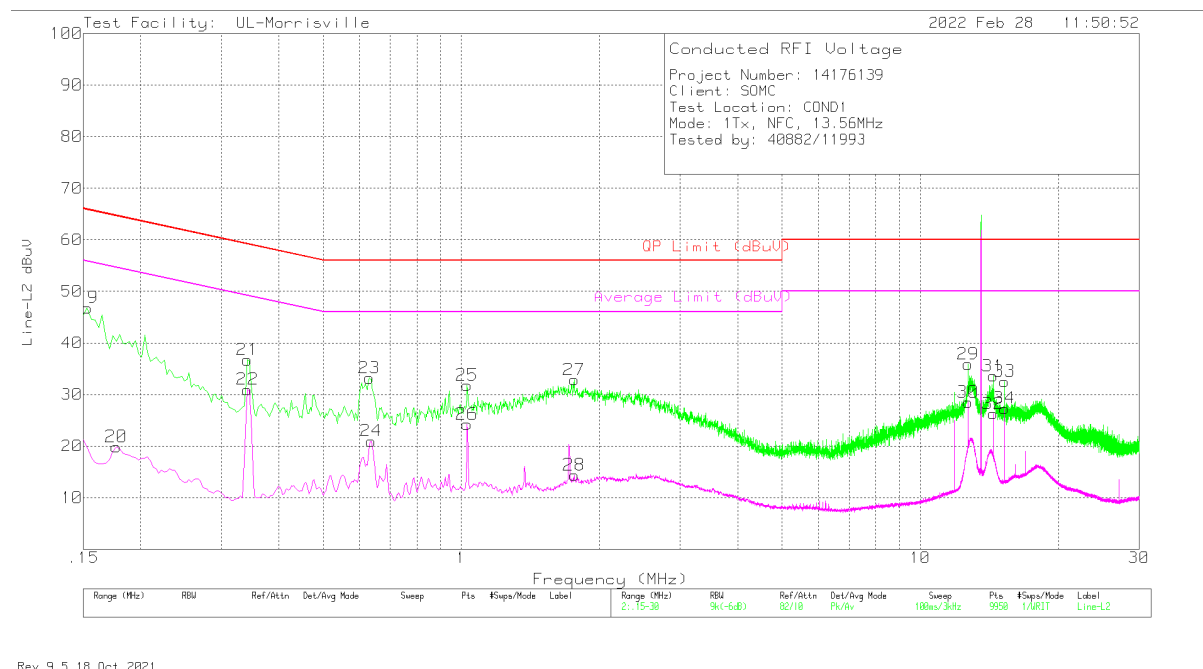
Range 1: Line-L1 .15 - 30MHz										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN VCF (dB)	Cbl/Limiter (dB)	Corrected Reading dBuV	QP Limit (dBuV)	Margin (dB)	Average Limit (dBuV)	Margin (dB)
1	.153	40.53	Pk	.2	9.8	50.53	65.84	-15.31	-	-
2	.171	11.98	Av	.2	9.8	21.98	-	-	54.91	-32.93
3	.255	29.27	Pk	.1	9.8	39.17	61.59	-22.42	-	-
4	.258	6.48	Av	.1	9.8	16.38	-	-	51.5	-35.12
5	.345	22.98	Pk	.1	9.8	32.88	59.08	-26.2	-	-
6	.345	13.24	Av	.1	9.8	23.14	-	-	49.08	-25.94
8	.597	11.87	Av	0	9.8	21.67	-	-	46	-24.33
7	.603	24.33	Pk	0	9.8	34.13	56	-21.87	-	-
9	1.029	23.98	Pk	0	9.8	33.78	56	-22.22	-	-
10	1.029	14.05	Av	0	9.8	23.85	-	-	46	-22.15
11	1.716	25.9	Pk	0	9.8	35.7	56	-20.3	-	-
12	1.716	11.49	Av	0	9.8	21.29	-	-	46	-24.71
13	12.711	23.64	Pk	.1	10.1	33.84	60	-26.16	-	-
14	12.714	14.42	Av	.1	10.1	24.62	-	-	50	-25.38
16	14.406	12.07	Av	.1	10.1	22.27	-	-	50	-27.73
15	14.409	21.49	Pk	.1	10.1	31.69	60	-28.31	-	-
17	15.255	20.31	Pk	.1	10.1	30.51	60	-29.49	-	-
18	15.255	13.3	Av	.1	10.1	23.5	-	-	50	-26.5

Pk - Peak detector

Av - Average detection

Note: 13.56MHz is a fundamental frequency of the EUT. Data under the following section indicate that when the antenna terminal is terminated the fundamental amplitude is lowered below the limit line.

LINE 2 RESULTS



DATA

Range 2: Line-L2 .15 - 30MHz										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN VCF (dB)	Cbl/Limiter (dB)	Corrected Reading dBuV	QP Limit (dBuV)	Margin (dB)	Average Limit (dBuV)	Margin (dB)
19	.153	36.81	Pk	.2	9.8	46.81	65.84	-19.03	-	-
20	.177	9.88	Av	.2	9.8	19.88	-	-	54.63	-34.75
21	.342	26.82	Pk	.1	9.8	36.72	59.15	-22.43	-	-
22	.342	21.08	Av	.1	9.8	30.98	-	-	49.15	-18.17
23	.63	23.4	Pk	0	9.8	33.2	56	-22.8	-	-
24	.636	11.19	Av	0	9.8	20.99	-	-	46	-25.01
25	1.029	21.99	Pk	0	9.8	31.79	56	-24.21	-	-
26	1.029	14.46	Av	0	9.8	24.26	-	-	46	-21.74
27	1.761	23.05	Pk	0	9.8	32.85	56	-23.15	-	-
28	1.761	4.57	Av	0	9.8	14.37	-	-	46	-31.63
29	12.714	25.68	Pk	.1	10.1	35.88	60	-24.12	-	-
30	12.714	18.33	Av	.1	10.1	28.53	-	-	50	-21.47
31	14.406	23.4	Pk	.1	10.1	33.6	60	-26.4	-	-
32	14.409	16.07	Av	.1	10.1	26.27	-	-	50	-23.73
33	15.255	22.35	Pk	.1	10.1	32.55	60	-27.45	-	-
34	15.255	17.13	Av	.1	10.1	27.33	-	-	50	-22.67

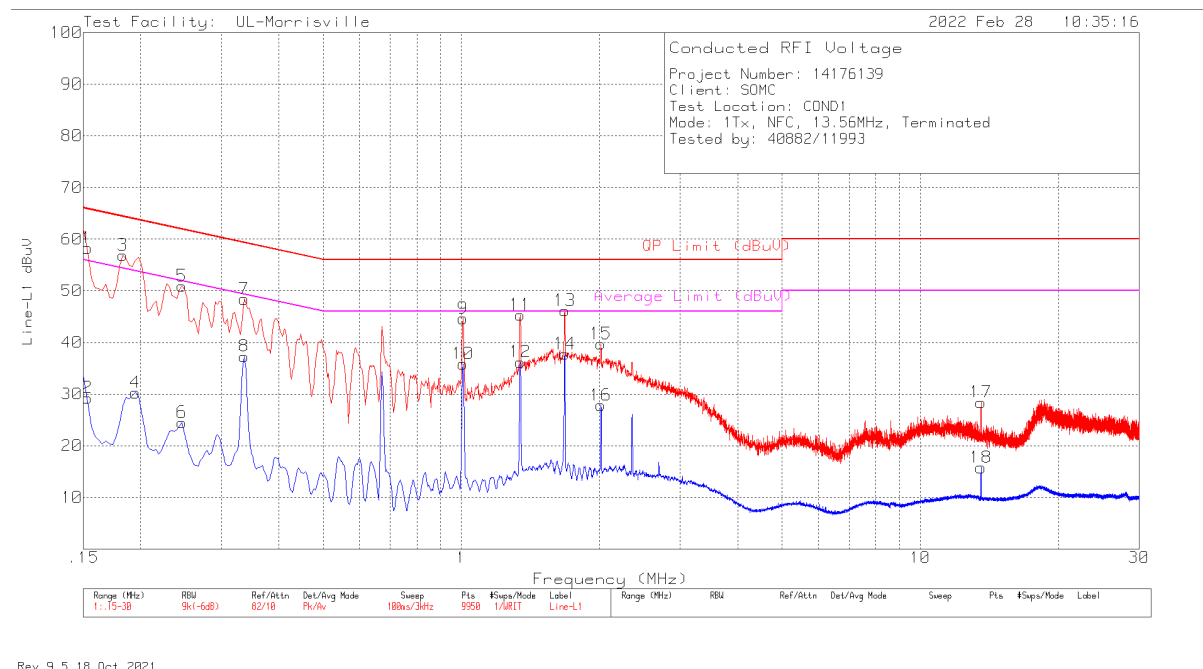
Pk - Peak detector

Av - Average detection

Note: 13.56MHz is a fundamental frequency of the EUT. Data under the following section indicate that when the antenna terminal is terminated the fundamental amplitude is lowered below the limit line.

10.1.2. NORMAL OPERATION WITH ANTENNA PORT TERMINATED

LINE 1 RESULTS



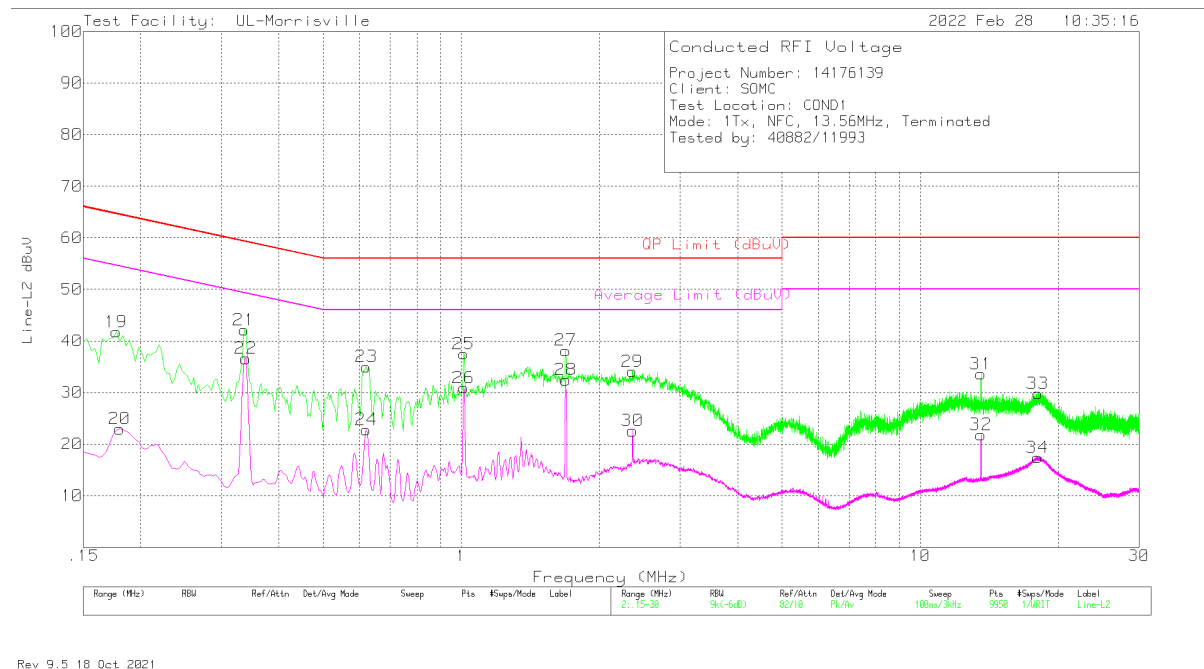
DATA

Range 1: Line-L1 .15 - 30MHz										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN VCF (dB)	Cbl/Limiter (dB)	Corrected Reading dBuV	QP Limit (dBuV)	Margin (dB)	Average Limit (dBuV)	Margin (dB)
1	.153	48.29	Pk	.2	9.8	58.29	65.84	-7.55	-	-
2	.153	19.28	Av	.2	9.8	29.28	-	-	55.84	-26.56
3	.183	46.91	Pk	.2	9.8	56.91	64.35	-7.44	-	-
4	.195	20.28	Av	.2	9.8	30.28	-	-	53.82	-23.54
5	.246	41.01	Pk	.1	9.8	50.91	61.89	-10.98	-	-
6	.246	14.6	Av	.1	9.8	24.5	-	-	51.89	-27.39
7	.336	38.52	Pk	.1	9.8	48.42	59.3	-10.88	-	-
8	.336	27.42	Av	.1	9.8	37.32	-	-	49.3	-11.98
9	1.008	34.85	Pk	0	9.8	44.65	56	-11.35	-	-
10	1.008	26.06	Av	0	9.8	35.86	-	-	46	-10.14
11	1.344	35.52	Pk	0	9.8	45.32	56	-10.68	-	-
12	1.344	26.41	Av	0	9.8	36.21	-	-	46	-9.79
13	1.68	36.36	Pk	0	9.8	46.16	56	-9.84	-	-
14	1.68	27.97	Av	0	9.8	37.77	-	-	46	-8.23
15	2.013	29.94	Pk	0	9.8	39.74	56	-16.26	-	-
16	2.013	18.04	Av	0	9.8	27.84	-	-	46	-18.16
17	13.56	18.22	Pk	.1	10.1	28.42	60	-31.58	-	-
18	13.56	5.58	Av	.1	10.1	15.78	-	-	50	-34.22

Pk - Peak detector

Av - Average detection

LINE 2 RESULTS



DATA

Range 2: Line-L2 .15 - 30MHz										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN VCF (dB)	Cbl/Limiter (dB)	Corrected Reading dBuV	QP Limit (dBuV)	Margin (dB)	Average Limit (dBuV)	Margin (dB)
19	.177	31.76	Pk	.2	9.8	41.76	64.63	-22.87	-	-
20	.18	12.96	Av	.2	9.8	22.96	-	-	54.49	-31.53
21	.336	32.22	Pk	.1	9.8	42.12	59.3	-17.18	-	-
22	.339	26.7	Av	.1	9.8	36.6	-	-	49.23	-12.63
23	.621	25.2	Pk	0	9.8	35	56	-21	-	-
24	.621	12.98	Av	0	9.8	22.78	-	-	46	-23.22
25	1.011	27.68	Pk	0	9.8	37.48	56	-18.52	-	-
26	1.011	21.11	Av	0	9.8	30.91	-	-	46	-15.09
27	1.689	28.36	Pk	0	9.8	38.16	56	-17.84	-	-
28	1.689	22.66	Av	0	9.8	32.46	-	-	46	-13.54
29	2.358	24.27	Pk	0	9.8	34.07	56	-21.93	-	-
30	2.361	12.79	Av	0	9.8	22.59	-	-	46	-23.41
31	13.56	23.37	Pk	.1	10.1	33.57	60	-26.43	-	-
32	13.56	11.62	Av	.1	10.1	21.82	-	-	50	-28.18
34	18.015	7.2	Av	.1	10.1	17.4	-	-	50	-32.6
33	18.027	19.62	Pk	.1	10.1	29.82	60	-30.18	-	-

Pk - Peak detector

Av - Average detection

11. SETUP PHOTOS

Please refer to R14176139-EP4 for setup photos.

END OF TEST REPORT