

FCC/ISED Test Report

Prepared for: Bosch Security Systems, LLC

Address: 3401 Village Drive, Suite 110
Lincoln NE 68516

Product: AP-1000 Access Point

Test Report No: R20240829-00-E5 **Rev:** 0

Approved by:



Fox Lane,
EMC Test Engineer

DATE: July 30, 2025

Total Pages: 52

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REVISION PAGE

Rev. No.	Date	Description
0	30 July 2025	Issued by FLane Prepared by FLane



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1.0 SUMMARY OF TEST RESULTS

The worst-case measurements were reported in this report. Summary of test results presented in this report correspond to the following section:

- (1) US Code of Federal Regulations, Title 47, Part 15
- (2) ISED RSS-Gen, Issue 5
- (3) ISED RSS-213, Issue 3

APPLIED STANDARDS AND REGULATIONS		
Standard Section	Test Type	Result
FCC Part 15.319(c)(e) RSS-213 Sec 6.5	Output Power	Pass
FCC Part 15.319(b) RSS-213 Sec 6.1	Digital Modulation Techniques	Pass
FCC Part 15.323(a) RSS-231 Sec. 6.4	Bandwidth	Pass
FCC Part 15.323(d) RSS-213 Sec. 6.7.2	In-band emissions	Pass
FCC Part 15.323(d) RSS-213 Sec 6.7.1	Out-of-band emissions	Pass
FCC Part 15.319(d) RSS-213 4.3.2.1	Power Spectral Density	Pass
FCC Part 15.319(f) RSS-213 Sec. 4.3.4	Automatic discontinuation	Pass
FCC Part 15.323 RSS-213 Sec. 4.3.4	Timing measurements	Pass
FCC Part 15.207 RSS-Gen Issue 5, Section 8.8	Conducted Emissions	Pass



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2.0 EUT DESCRIPTION

2.1 EQUIPMENT UNDER TEST

Summary and Operating Condition:

EUT	AP-1000 Access Point
FCC ID	B5DM545
IC ID	1321A-AP1000
EUT Received	4 November 2024
EUT Tested	4 November 2024- 2 July 2025
Serial No.	045661447524010029 045661447524010032
Operating Band	1920 – 1930 MHz
Device Type	☐ GMSK ☐ GFSK ☐ BT BR ☐ BT EDR 2MB ☐ BT EDR 3MB ☐ 802.11x ☒ DECT
Power Supply / Voltage	Power-Over-Ethernet (PoE) 802.3at (PoE+) or 802.3bt (PoE++) Can be powered using either EtherCON port. Device cannot source power to another AP or other device. Power Supply (Optional): 12VDC in-line power supply Battery (Optional): Li-Ion, Anton Bauer Titon 90, 14.2 VDC, 92 Wh

NOTE: For more detailed features description, please refer to the manufacturer's specifications or user's manual.

2.2 DESCRIPTION OF TEST MODES

The operating range of the EUT is dependent on the device type found in section 2.1:

DECT Transmissions:

Channel	Frequency
Low	1921.536 MHz
High	1928.448 MHz

These are the only representative channels tested in the frequency range according to FCC Part 15.31 and RSS-Gen Table A1. See the operational description for a list of all channel frequencies and designations.

2.3 DESCRIPTION OF SUPPORT UNITS

For timing measurements or connection results. The device was paired/connected to a CMD60 communications analyzer.

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3.0 LABORATORY AND GENERAL TEST DESCRIPTION

3.1 LABORATORY DESCRIPTION

All testing was performed at the following Facility:

The Nebraska Center for Excellence in Electronics (NCEE Labs)
 4740 Discovery Drive
 Lincoln, NE 68521
 A2LA Certificate Number: 1953.01
 FCC Accredited Test Site Designation No: US1060
 Industry Canada Test Site Registration No: 4294A
 NCC CAB Identification No: US0177

Environmental conditions varied slightly throughout the tests:

Relative humidity of $35 \pm 4\%$
 Temperature of $22 \pm 3^{\circ}$ Celsius



3.2 TEST PERSONNEL

No.	PERSONNEL	TITLE	ROLE
1	Fox Lane	Test Engineer	Testing and Report
2	Ethan Schmidt	Test Engineer	Testing and Report

Notes: All personnel are permanent staff members of NCEE Labs. No testing or review was sub-contracted or performed by sub-contracted personnel.



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3.3 TEST EQUIPMENT

DESCRIPTION AND MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CALIBRATION DATE	CALIBRATION DUE DATE
Keysight MXE Signal Analyzer (44GHz)	N9038A	MY59050109	July 17, 2024	July 18, 2026
Keysight MXE Signal Analyzer (26.5GHz)	N9038A	MY56400083	July 17, 2024	July 18, 2026
Keysight EXA Signal Analyzer	N9010A	MY56070862	July 18, 2023	July 17, 2025
SunAR RF Motion	JB1	A082918-1	July 17, 2024	July 17, 2025
EMCO Horn Antenna	3117	29616	June 12, 2024	June 12, 2026
EMCO Horn Antenna	3116	2576	July 31, 2023	July 30, 2025
Com-Power LISN, Single Phase	LI-220C	20070017	July 17, 2023	July 17, 2025
Agilent Preamp*	87405A	3207A01475	May 2, 2024	May 2, 2026
ETS Red Preamplifier (Orange)*	3115-PA	00218576	January 22, 2024	January 22, 2026
Keysight MXG Analog Signal Generator	N5183B	MY59100122	July 18, 2023	July 18, 2025
Rohde & Schwarz Vector Signal Generator	SMBV100B	1423.1003K02-102434-Hd	June 17, 2024	June 17, 2026
Trilithic High Pass Filter*	6HC330	23042	June 5, 2023	June 5, 2026
Rohde and Schwarz Communication Analyzer	CMD60	827462/036	December 12, 2024	December 12, 2026
ETS – Lindgren- VSWR on 10m Chamber	10m Semi-anechoic chamber-VSWR	4740 Discovery Drive	May 15, 2024	May 15, 2027
NCEE Labs-NSA on 10m Chamber*	10m Semi-anechoic chamber-NSA	NCEE-001	May 22, 2024	May 22, 2026
RF Cables (3m Ant. to Control room Bulkhead)	MFR-57500	1E3874	January 20, 2024	January 20, 2026
RF Cable (antenna to 10m chamber bulkhead)*	FSCM 64639	01E3872	January 21, 2024	January 21, 2026
RF Cable (10m chamber bulkhead to control room bulkhead)*	FSCM 64639	01E3874	January 21, 2024	January 21, 2026
RF Cable (control room bulkhead to test receiver)*	FSCM 64639	01F1206	January 21, 2024	January 21, 2026
N connector bulkhead (10m chamber)*	PE9128	NCEEBH1	January 21, 2024	January 21, 2026
N connector bulkhead (control room)*	PE9128	NCEEBH2	January 21, 2024	January 21, 2026
TDK Emissions Lab Software	V11.25	700307	NA	NA

*Internal Characterization

3.4 GENERAL TEST PROCEDURE AND SETUP FOR RADIO MEASUREMENTS

Measurement type presented in this report (Please see the checked box below):

Conducted ☒

The conducted measurements were performed by connecting the output of the transmitter directly into a spectrum analyzer using an impedance matched cable and connector soldered to the EUT in place of the antenna. The information regarding resolution bandwidth, video bandwidth, span and the detector used can be found in the graphs provided in Appendix C. All the radio measurements were performed using the sections from ANSI C63.10, details about the section used can be found in the spectrum analyzer titles on the graph. For measurements requiring packet/timing measurements, a companion device or a CMD60 communication analyzer was also connected to the EUT.

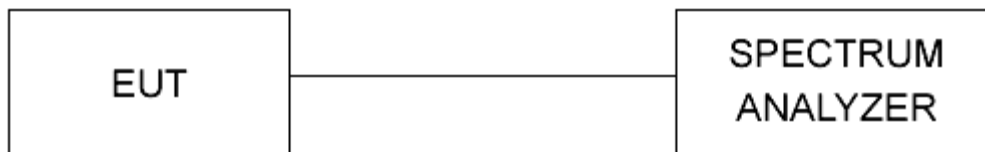


Figure 1 - Bandwidth Measurements Test Setup

Radiated ☒

All the radiated measurements were taken at a distance of 3m from the EUT. The information regarding resolution bandwidth, video bandwidth, span and the detector used can be found in the graphs provided in Appendix C. All the radio measurements were performed using the sections from ANSI C63.10, details about the section used can be found in the spectrum analyzer titles on the graph.

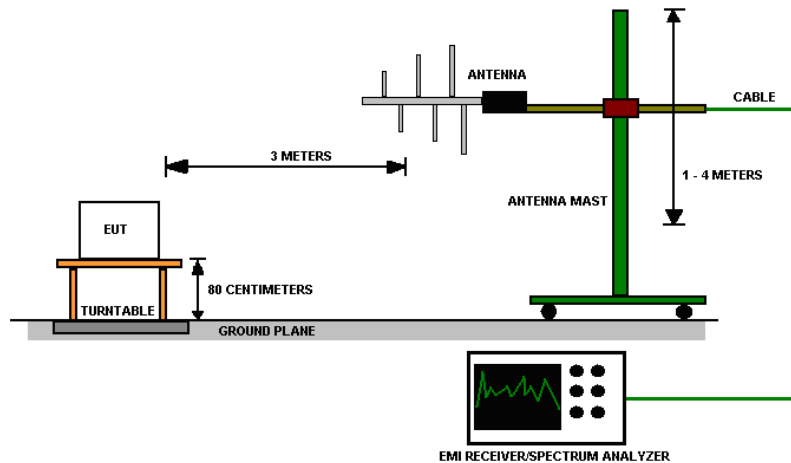


Figure 2 - Radiated Emissions Test Setup

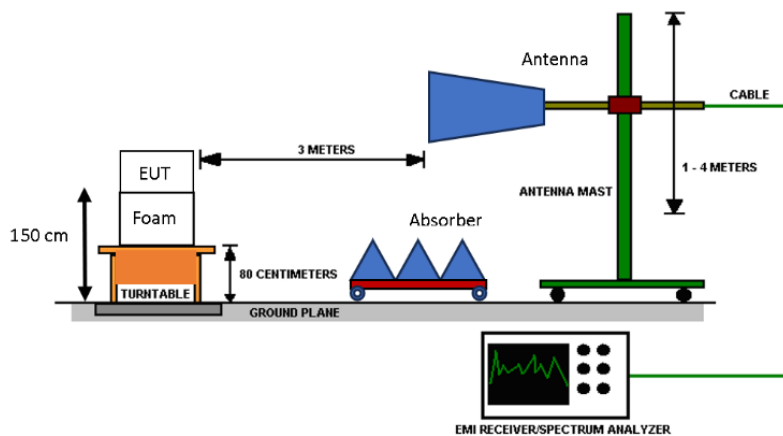


Figure 3 - Radiated Emissions Test Setup, >1GHz



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4.0 RESULTS

DECT Radio Measurements						
CHANNEL	Mode	Occupied BW (kHz)	PSD (dBm)	Peak OUTPUT POWER (dBm)	Peak OUTPUT POWER (mW)	RESULT
Low	Ant 1	1180.7	2.710	18.531	71.302	PASS
High	Ant 1	1175.8	2.460	18.347	68.344	PASS
Low	Ant 2	1188.0	3.043	18.845	76.648	PASS
High	Ant 2	1183.8	2.716	18.615	72.694	PASS
Occupied Bandwidth Lim = 50kHz < X < 2.5MHz				Peak Output Power Lim = see Sec 4.1; PSD Lim = 3mW/4.77dBm		



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4.1 OUTPUT POWER

Test Method:

All measurements were performed using section 11.9.1.1 from ANSI C63.10.

Limits of power measurements:

$$100\mu\text{W} * \sqrt{[\text{BW}(\text{Hz})]}$$

$$100 * \sqrt{(1.1188 * 10^6)} = 105773.3426\mu\text{W} = 105.7733426\text{mW} = 20.244\text{dBm}$$

Test procedures:

Details can be found in section 3.4 of this report.

Deviations from test standard:

No deviation.

Test setup:

Details can be found in section 3.4 of this report.

EUT operating conditions:

Details can be found in section 2.1 of this report.

Test results:

Pass

Comments:

1. All the output power plots can be found in Appendix C.
2. All the measurements were found to be compliant.
3. Tabulated data is listed in section 4.0.



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4.2 BANDWIDTH

Test Method:

C63.10 Sec 11.8

Limits of bandwidth measurements:

Occupied bandwidth must be greater than 50kHz and less than 2.5MHz

Test procedures:

Details can be found in section 3.4 of this report.

Deviations from test standard:

No deviation.

Test setup:

Test setup details can be found in section 3.4 of this report.

EUT operating conditions:

Details can be found in section 2.1 of this report.

Test results:

Pass

Comments:

1. All the bandwidth plots can be found in Appendix C.
2. All the measurements were found to be compliant.
3. Tabulated data is listed in section 4.0.



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4.3 DUTY CYCLE

The worst-case duty cycle declared by the manufacturer is $41.66\% = 0.4166$

DCCF (For Emissions) = $20 \cdot \log(1/0.4166) = \mathbf{7.606dB}$

DCCF (For Power) = $10 \cdot \log(1/0.4166) = \mathbf{3.803dB}$



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4.4 RADIATED EMISSIONS

Test Method:

ANSI C63.4-2020, Section 8

Limits for radiated emissions measurements:

15.109 Class A (for unintentional spurious emissions)

See out of band emissions for limits pertaining to transmitter.

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = $20 * \log * \text{Emission level } (\mu\text{V/m})$.
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits by more than 20dB under any condition of modulation.



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Test procedures:

- a. The EUT was placed on the top of a rotating table above the ground plane in a 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation. The table was 0.8m high for measurements from 30MHz-1Ghz and 1.5m for measurements from 1GHz and higher.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna was a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are used to make the measurement.
- d. For each suspected emission, the EUT was arranged to maximize its emissions and then the antenna height was varied from 1 meter to 4 meters and the rotating table was turned from 0 degrees to 360 degrees to find the maximum emission reading.
- e. The test-receiver system was set to use a peak detector with a specified resolution bandwidth. For spectrum analyzer measurements, the composite maximum of several analyzer sweeps was used for final measurements.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- g. The EUT was maximized in all 3 orthogonal positions. The results are presented for the axis that had the highest emissions.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequencies below 1GHz.
2. The resolution bandwidth 1 MHz for all measurements and at frequencies above 1GHz, A peak detector was used for all measurements above 1GHz. Measurements were made with an EMI Receiver.

Deviations from test standard:

No deviation.

EUT operating conditions

Details can be found in section 2.1 of this report.

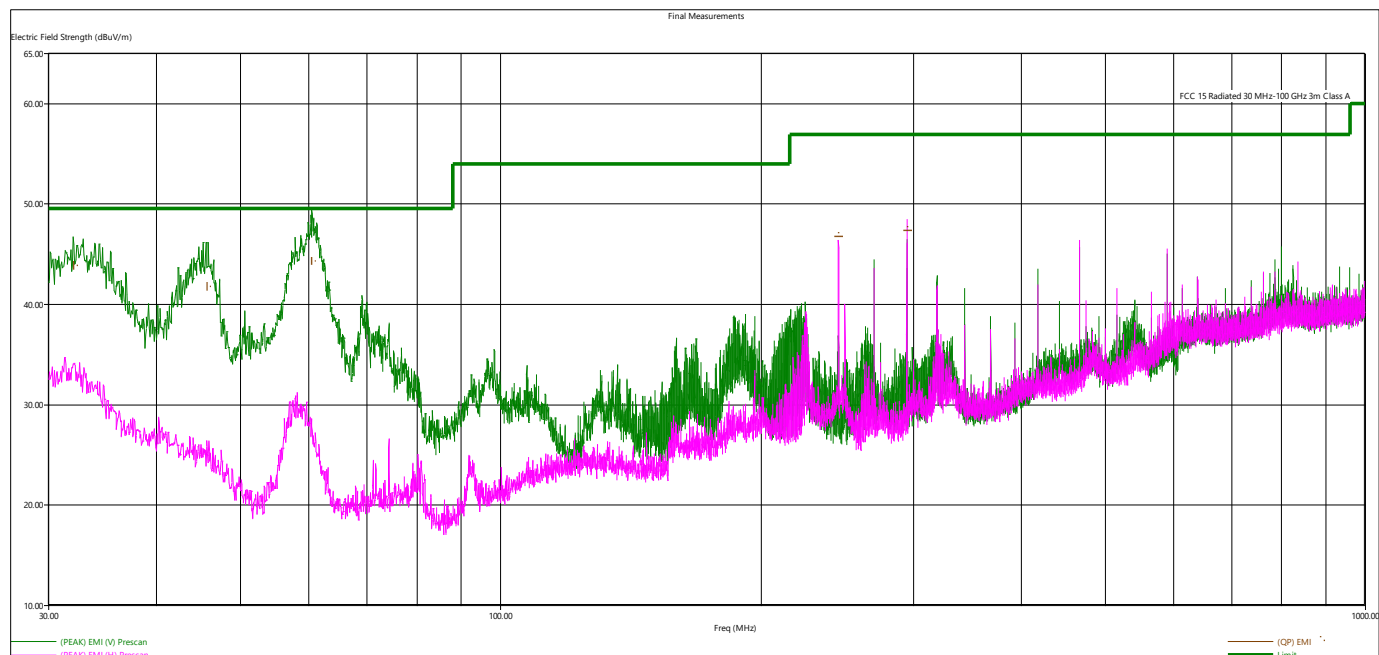


Figure 4 - Radiated Emissions Plot, DECT RX, PoE

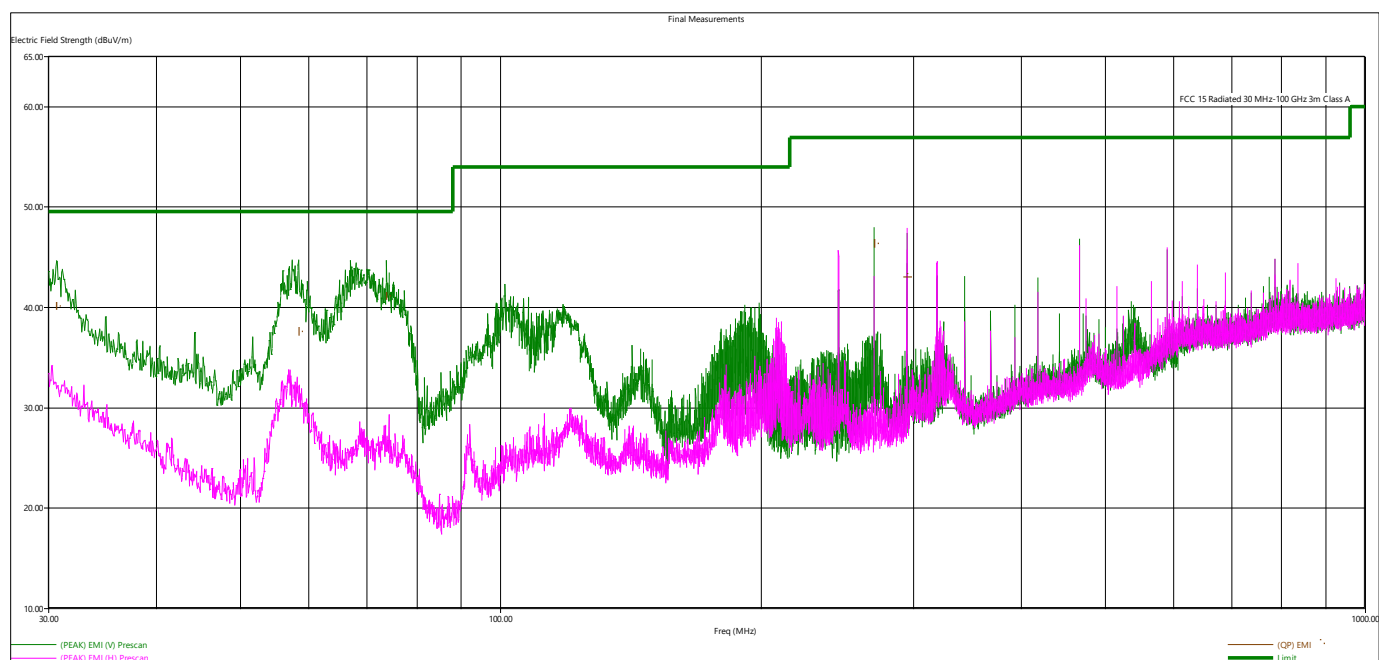


Figure 5 - Radiated Emissions Plot, DECT RX, XLR PSU

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB)
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. Margin value = Emission level - Limit value
4. Emissions were investigated up to 20GHz. No other emissions were found to be within 10dB of the applicable limits and therefore were not tabulated.

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Quasi-Peak Measurements, 30MHz – 1GHz								
Frequency	Level	Limit	Margin	Height	Angle	Pol	PSU	Modulation
MHz	dBµV/m	dBµV/m	dB	cm.	deg.			
294.906960	42.92	56.90	13.98	263.02	257.00	H	XLR	Rx
30.609120	40.05	49.54	9.49	113.35	261.75	V	XLR	Rx
58.501680	37.53	49.54	12.01	120.70	104.50	V	XLR	Rx
73.707600	41.11	49.54	8.43	112.52	91.25	V	XLR	Rx
270.346320	46.32	56.90	10.58	155.08	360.00	V	XLR	Rx
245.761920	46.63	56.90	10.27	112.46	268.00	H	PoE	Rx
294.909840	47.28	56.90	9.62	104.16	89.00	H	PoE	Rx
32.156640	43.83	49.54	5.71	112.28	211.00	V	PoE	Rx
45.827040	41.75	49.54	7.79	104.40	82.50	V	PoE	Rx
60.544320	44.24	49.54	5.30	122.73	355.50	V	PoE	Rx

The EUT was maximized in all 3 orthogonal axes. The worst-case is shown in the plot and table above.

Peak Measurements, >1GHz								
Frequency	Level	Limit	Margin	Height	Angle	Pol	Ant.	Ch.
MHz	dBµV/m	dBµV/m	dB	cm.	deg.			
3842.346000	48.65	73.98	25.33	133.47	128.50	V	2	Low
3858.708000	42.34	73.98	31.64	170.01	195.00	V	1	High

Average Measurements, >1GHz								
Frequency	Level	Limit	Margin	Height	Angle	Pol	Ant.	Ch.
MHz	dBµV/m	dBµV/m	dB	cm.	deg.			
3842.346000	41.044	53.98	12.936	133.47	128.50	V	2	Low
3858.708000	34.734	53.98	19.246	170.01	195.00	V	1	High
Average level = Peak Level – DCCF (for emissions) For more information regarding DCCF, see section 4.3								



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4.5 POWER SPECTRAL DENSITY

Test Method:

C63.17 Sec 6.1.5

Limits:

The maximum PSD allowed is 3mW/4.77dBm

Test procedures:

Details can be found in section 3.4 of this report.

Deviations from test standard:

No deviation.

Test setup:

Details can be found in section 3.4 of this report.

EUT operating conditions:

Details can be found in section 2.1 of this report.

Test results:

Pass

Comments:

1. All the Power Spectral Density (PSD) plots can be found in Appendix C.
2. All the measurements were found to be compliant.
3. Tabulated data is listed in section 4.0.

4.6 CONDUCTED AC MAINS EMISSIONS

Test Method: ANSI C63.10-2020, Section(s) 6.2

Limits for conducted emissions measurements:

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

Notes:

1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz
3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

Test Procedures:

- a. The EUT was placed 0.8m above a ground reference plane and 0.4 meters from the conducting wall of a shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). The LISN provides 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference as well as the ground.
- c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels over 10dB under the prescribed limits are not reported.
- d. Results were compared to the 15.207 limits.

Deviation from the test standard:

No deviation

EUT operating conditions:

Details can be found in section 2.1 of this report.

Test Results:



Figure 6 – Conducted Emissions Plot, Line

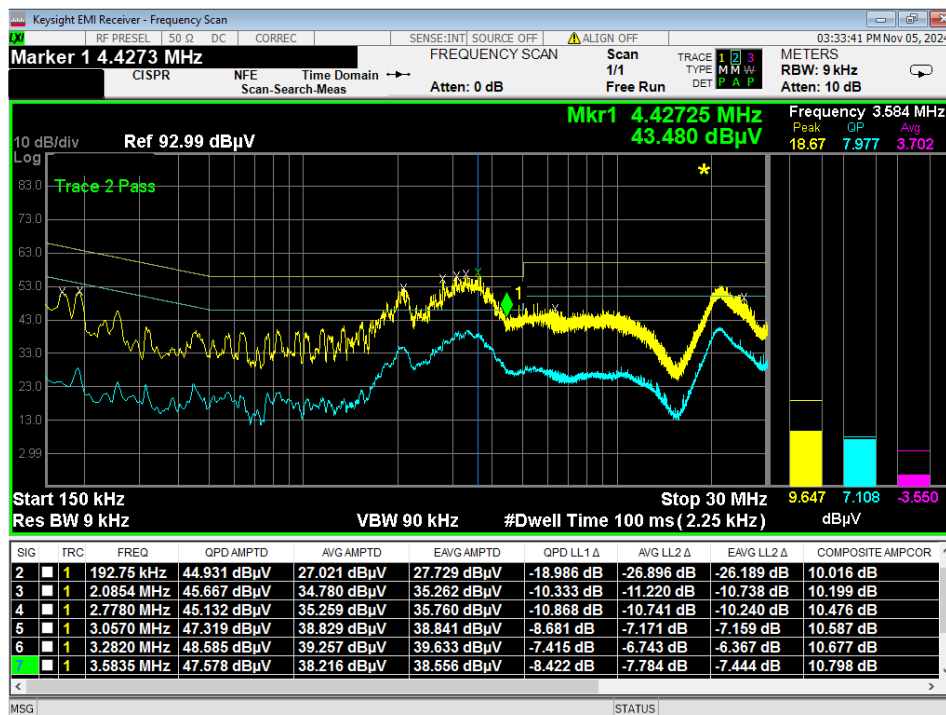


Figure 7 – Conducted Emissions Plot, Neutral



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4.7 AUTOMATIC DISCONTINUATION

Test Method: ANSI C63.27, Section 7.8.2, 7.8.3, 7.8.4

Limits

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. This provision is not intended to preclude transmission of control and signaling information or use or repetitive code used by certain digital modulation technologies to complete frame or burst intervals.

Test setup:

Details can be found in section 3.4 of this report.

EUT operating conditions:

Details can be found in section 2.1 of this report.

Test results:

Reaction	Test
connection lost	Power removed from EUT
connection lost	Power removed from companion device (comm. analyzer)
connection lost	EUT turned off
connection lost	companion device turned off

Pass

4.8 IN-BAND EMISSIONS

Test Method: ANSI C63.17, Section 6.1.6.1

Limits:

B < f2 ≤2B: 2B < f2 ≤3B:	less than or equal to 30 dB below max. permitted peak power level
3B < f2 ≤UPCS Band	level less than or equal to 50 dB below max. permitted peak power level
Edge:	power level less than or equal to 60 dB below max. permitted peak power level

Test setup:

Details can be found in section 3.4 of this report.

EUT operating conditions:

Details can be found in section 2.1 of this report.

Test results:

Pass

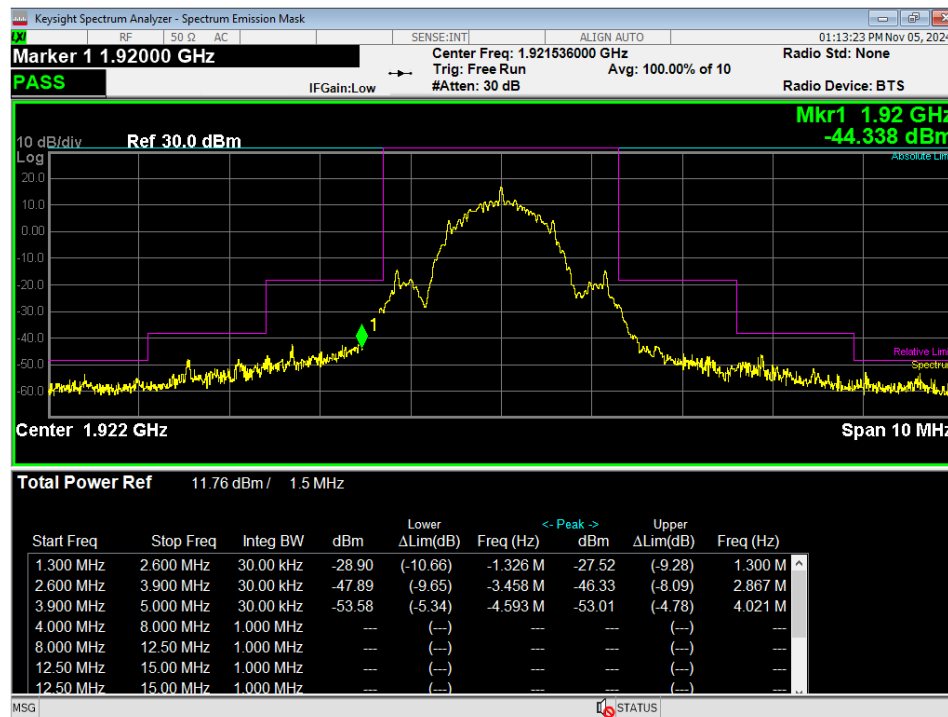


Figure 8 – In-Band Spurious Emissions, Low Channel

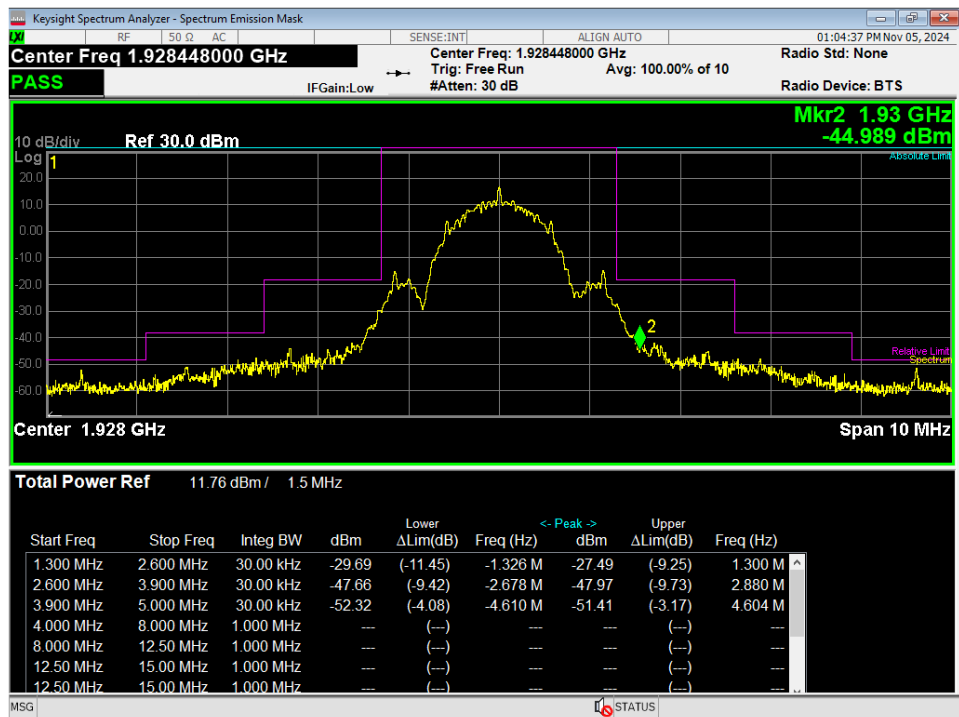


Figure 9 – In-Band Spurious Emissions, High Channel



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4.9 OUT-OF-BAND EMISSIONS

Test Method: ANSI C63.17, Section 6.1.6.2

Limits:

Emissions outside the band shall be attenuated below a reference power of 112 milliwatts as follows: 30 dB between the band and 1.25 MHz above or below the band; 50 dB between 1.25 and 2.5 MHz above or below the band; and 60 dB at 2.5 MHz or greater above or below the band. Emissions inside the band must comply with the following emission mask: In the bands between 1B and 2B measured from the center of the emission bandwidth the total power emitted by the device shall be at least 30 dB below the transmit power permitted for that device; in the bands between 2B and 3B measured from the center of the emission bandwidth the total power emitted by an intentional radiator shall be at least 50 dB below the transmit power permitted for that radiator; in the bands between 3B and the band edge the total power emitted by an intentional radiator in the measurement bandwidth shall be at least 60 dB below the transmit power permitted for that radiator. B" is defined as the emission bandwidth of the device in hertz. Compliance with the emission limits is based on the use of measurement instrumentation employing peak detector function with an instrument resolution bandwidth approximately equal to 1.0 percent of the emission bandwidth of the device under measurement.

$f \leq 1.25$ MHz outside UPCS band:	≤ -9.5 dBm
$1.25 \text{ MHz} \leq f \leq 2.5$ MHz outside UPCS band:	≤ -29.5 dBm
$f \geq 2.5$ MHz outside UPCS band:	≤ -39.5 dBm

Test setup:

Details can be found in section 3.4 of this report.

EUT operating conditions:

Details can be found in section 2.1 of this report.

Test results:

Pass

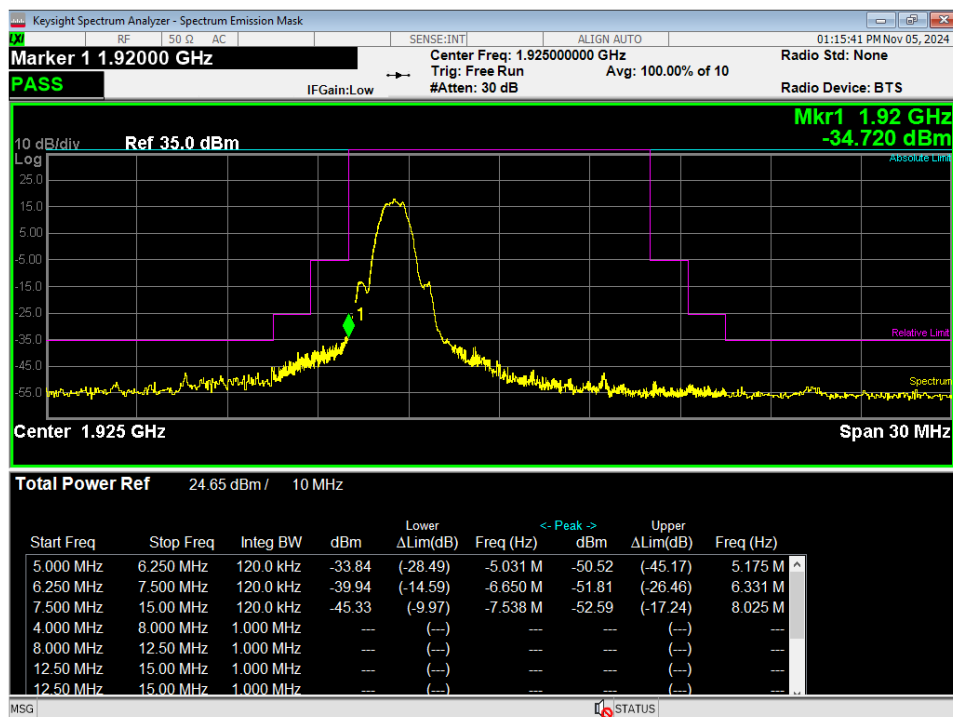


Figure 10 – Out-of-Band Spurious Emissions, Low Channel, Ant 1

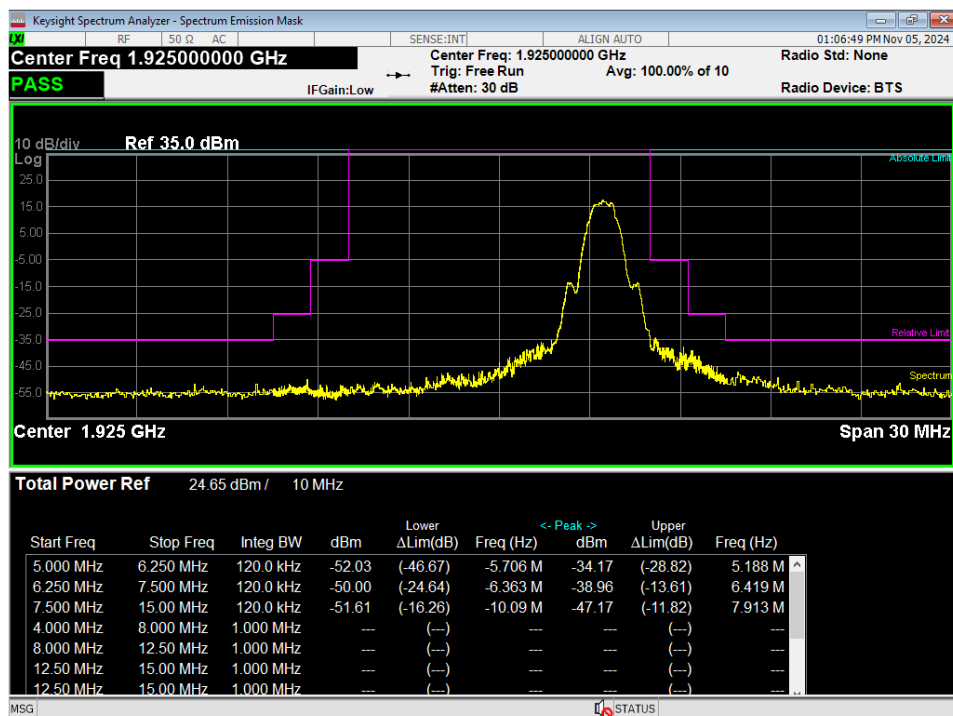


Figure 11 – Out-of-Band Spurious Emissions, High Channel, Ant 1

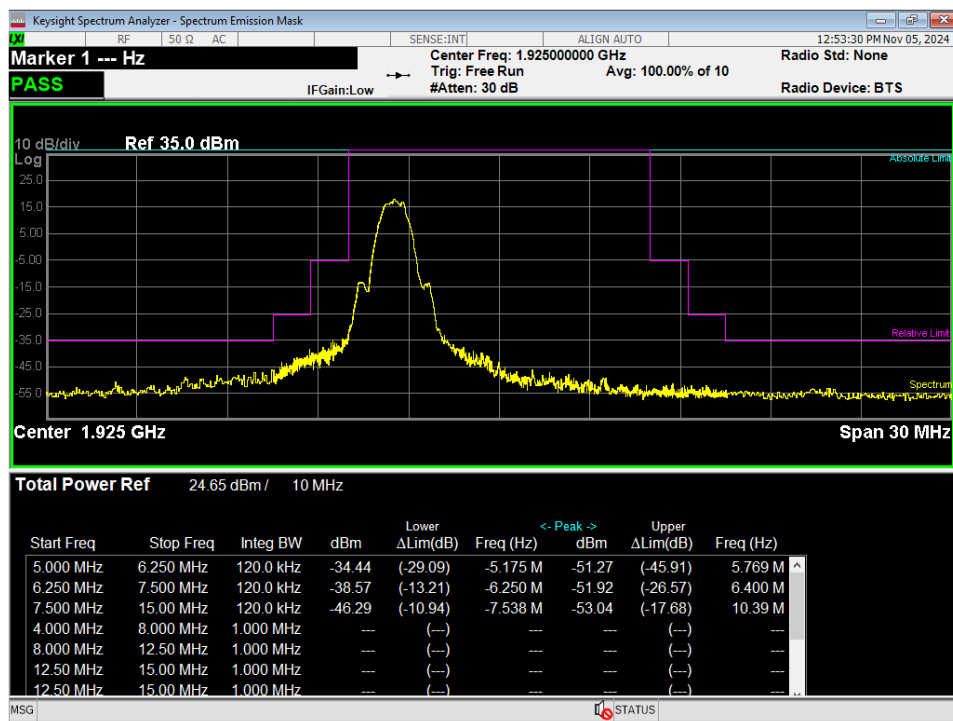


Figure 12 – Out-of-Band Spurious Emissions, Low Channel, Ant 2

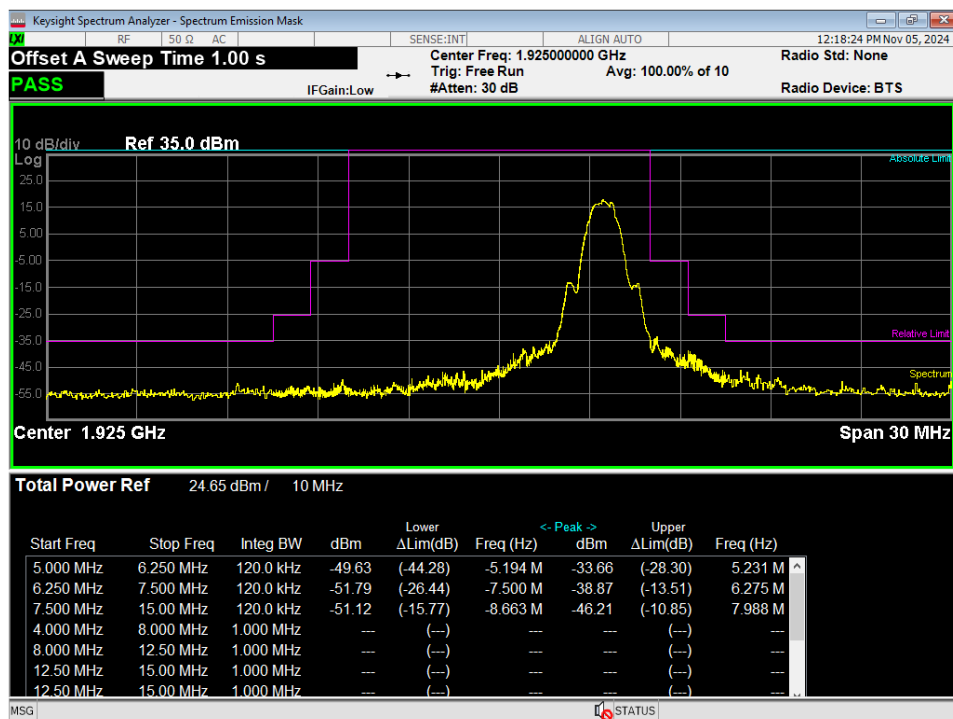


Figure 13 – Out-of-Band Spurious Emissions, High Channel, Ant 2

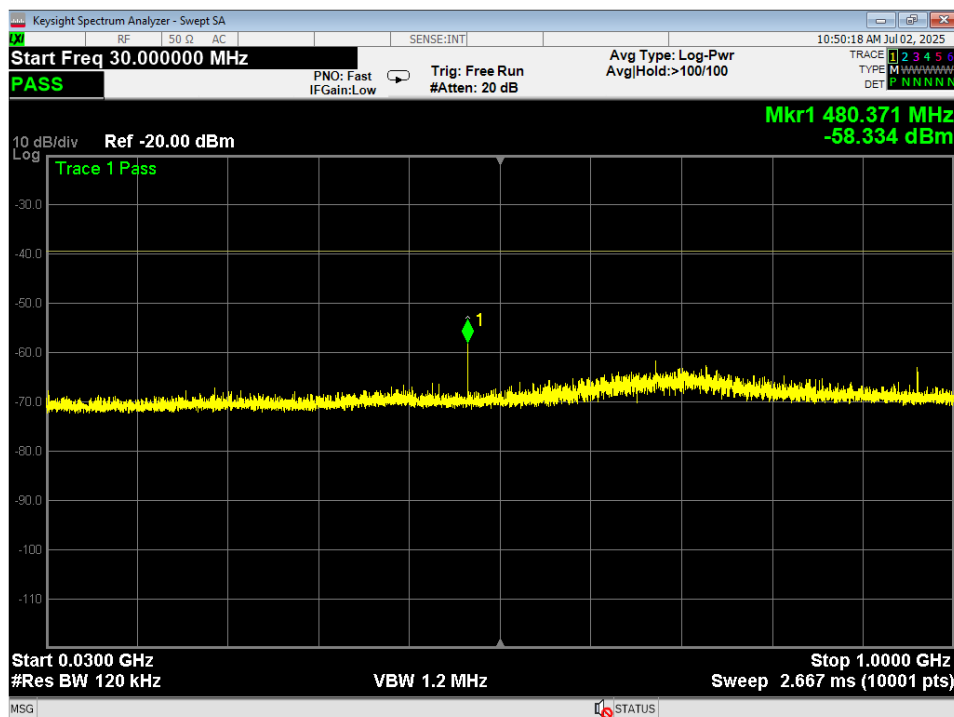


Figure 14 – Out-of-Band Spurious Emissions, 30MHz – 1GHz, Low Channel, Ant 1

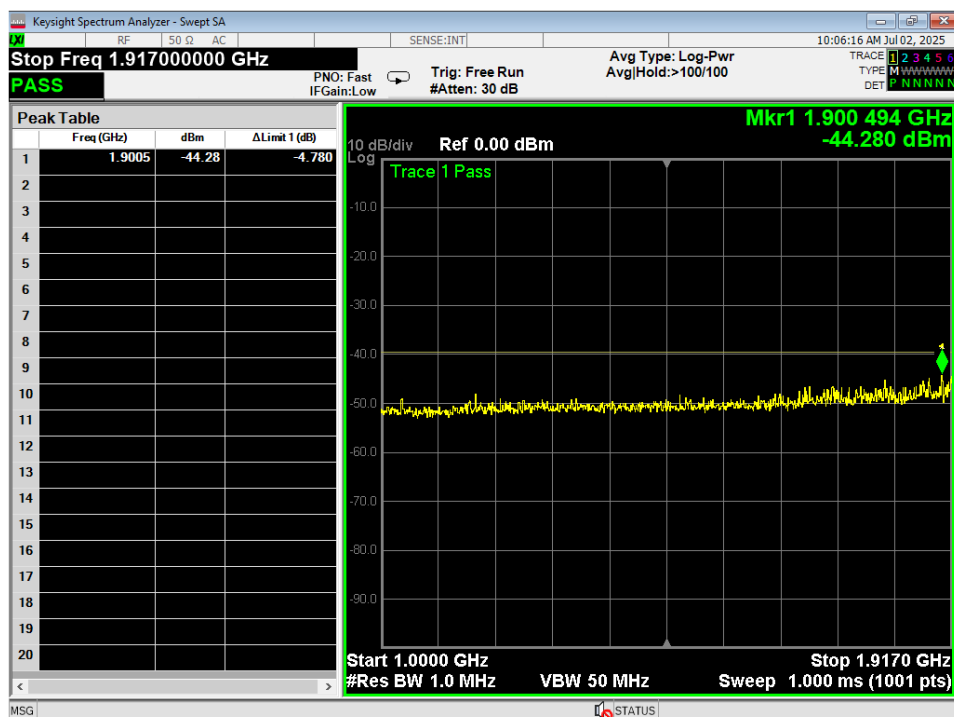


Figure 15 – Out-of-Band Spurious Emissions, 1GHz – 1.917GHz, Low Channel, Ant 1

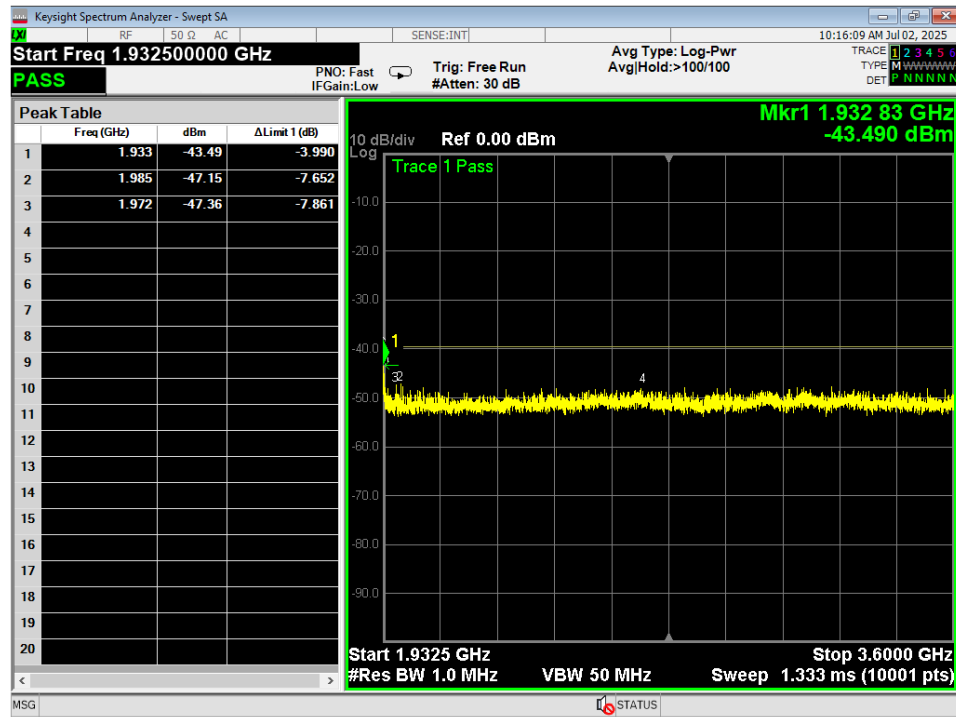


Figure 16 – Out-of-Band Spurious Emissions, 1.9325GHz – 3.6GHz, Low Channel, Ant 1

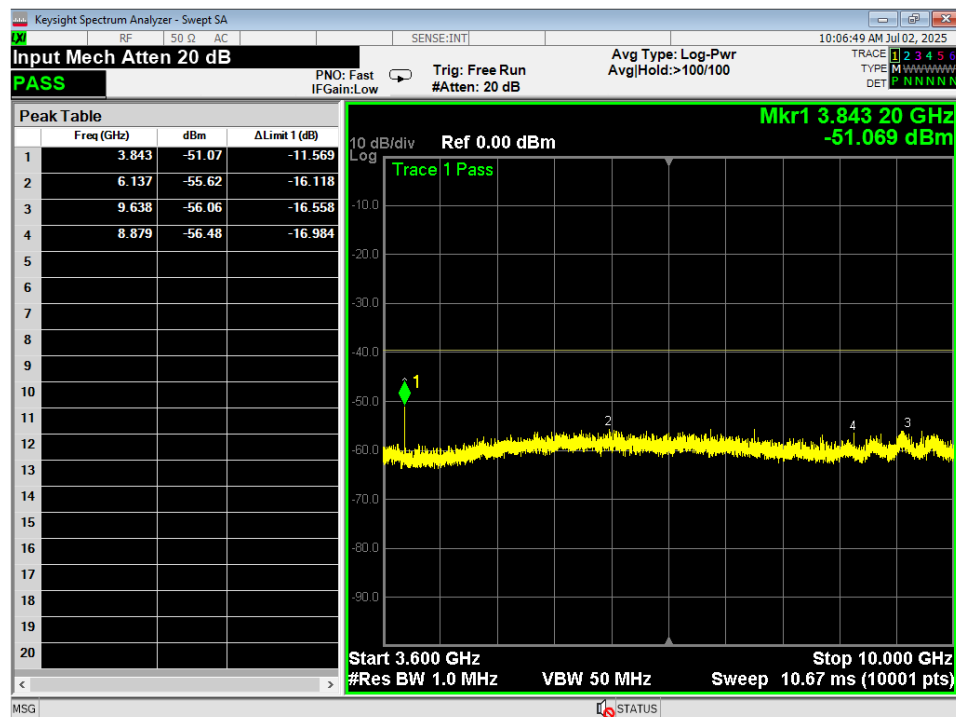


Figure 17 – Out-of-Band Spurious Emissions, 3.6GHz – 10GHz, Low Channel, Ant 1

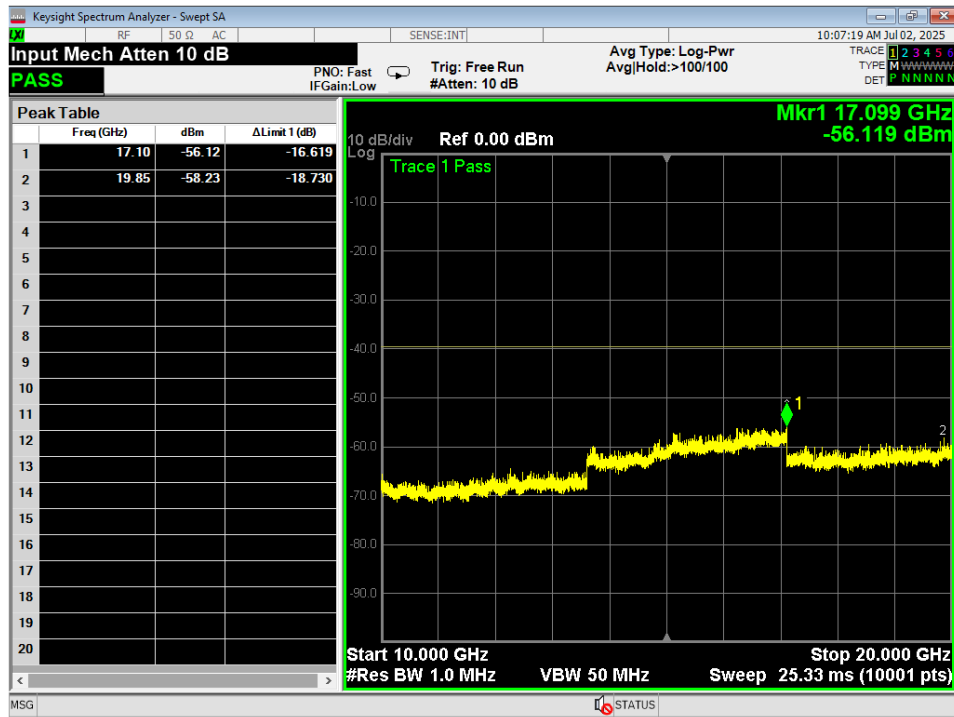


Figure 18 – Out-of-Band Spurious Emissions, 10GHz – 20GHz, Low Channel, Ant 1

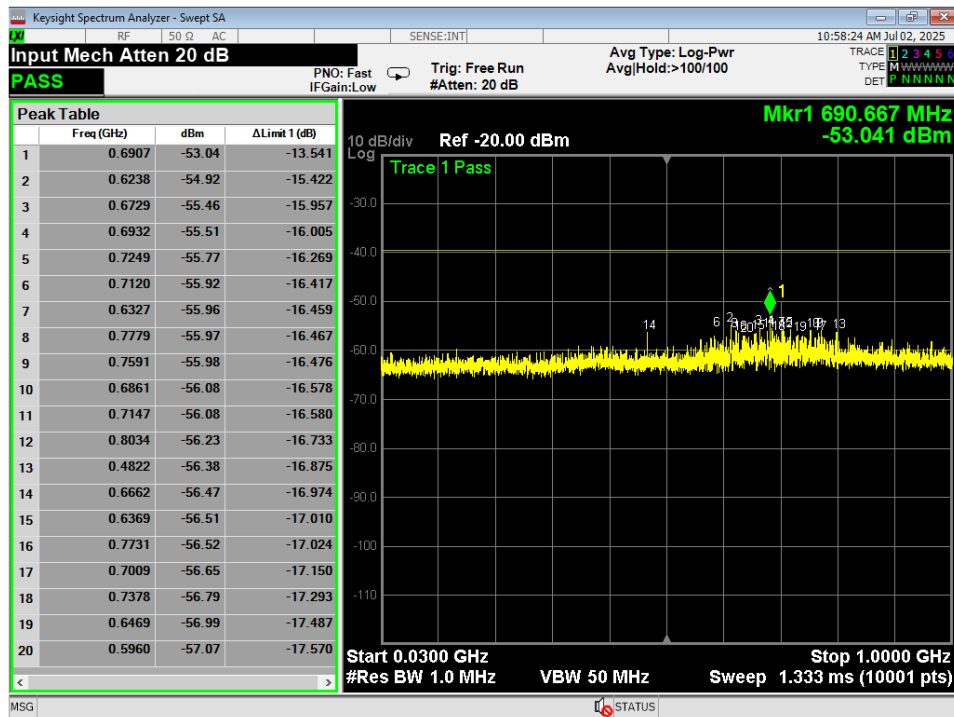


Figure 19 – Out-of-Band Spurious Emissions, 30MHz – 1GHz, High Channel, Ant 1

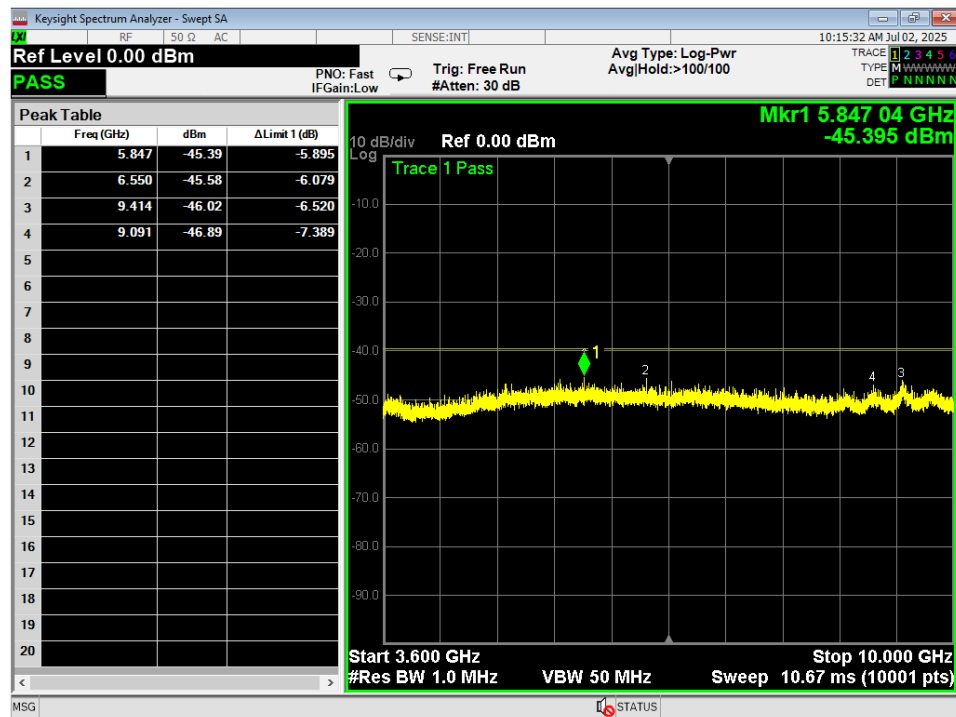


Figure 22 – Out-of-Band Spurious Emissions, 3.6GHz – 10GHz, High Channel, Ant 1

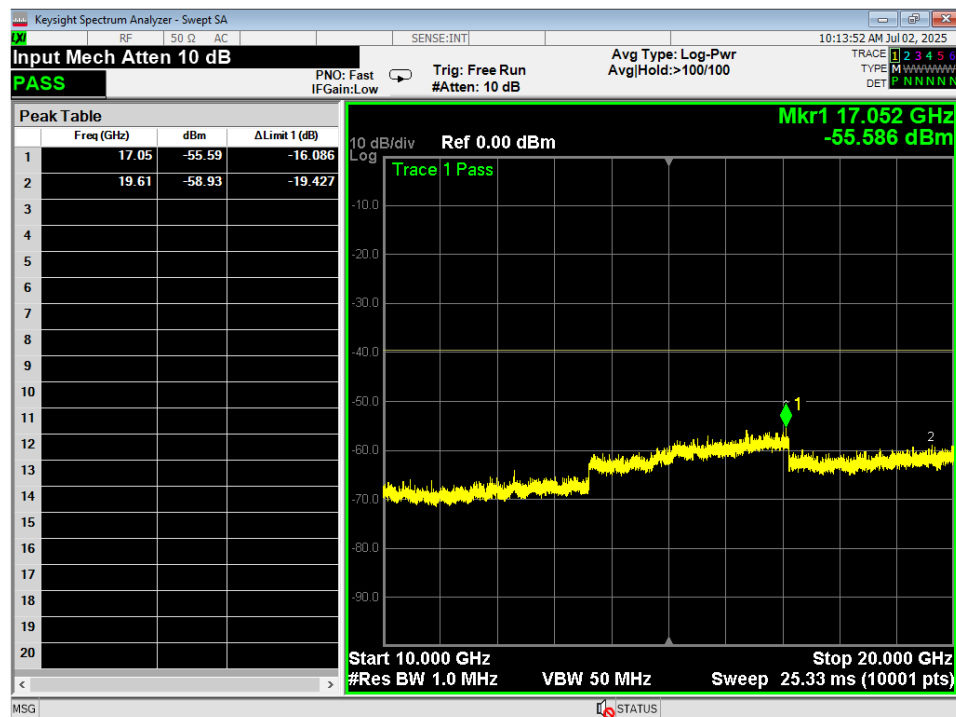


Figure 23 – Out-of-Band Spurious Emissions, 10GHz – 20GHz, High Channel, Ant 1

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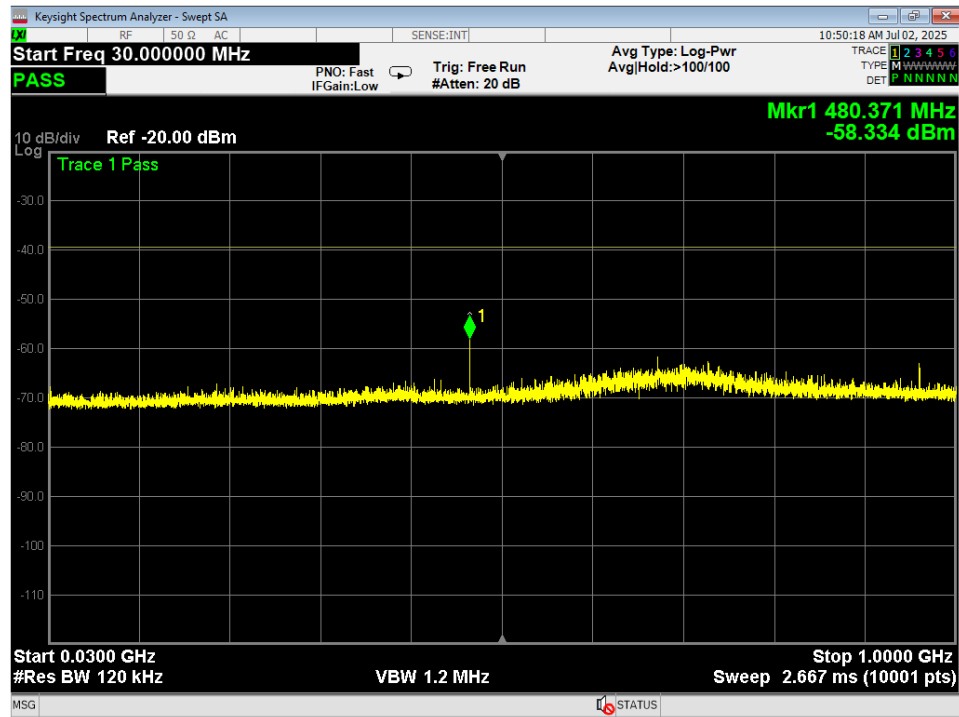


Figure 24 – Out-of-Band Spurious Emissions, 30MHz – 1GHz, Low Channel, Ant 2

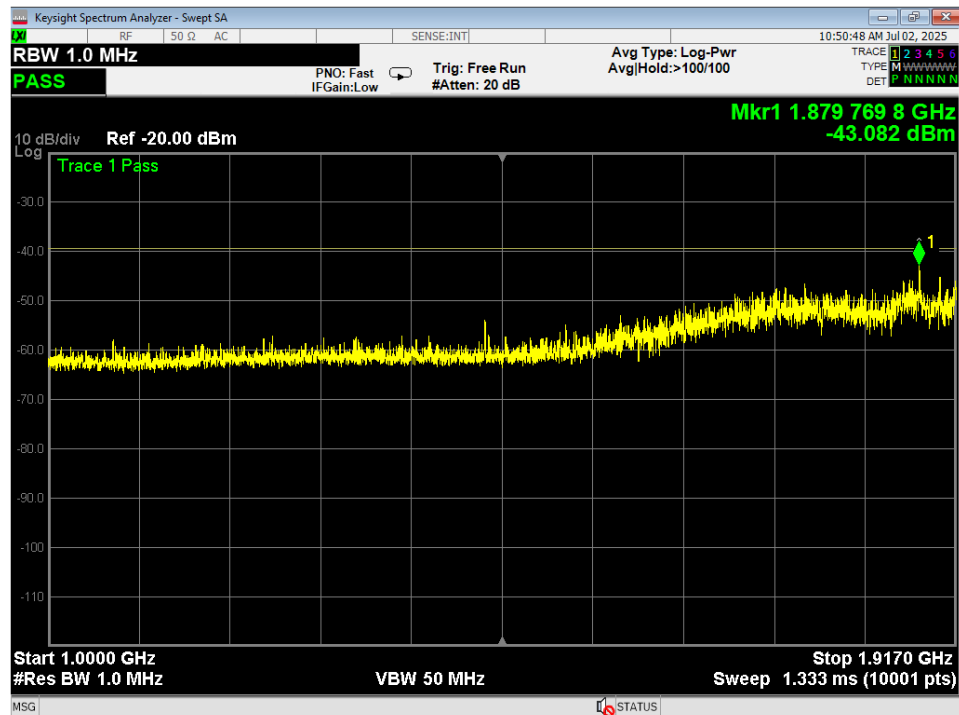


Figure 25 – Out-of-Band Spurious Emissions, 1GHz – 1.917GHz, Low Channel, Ant 2

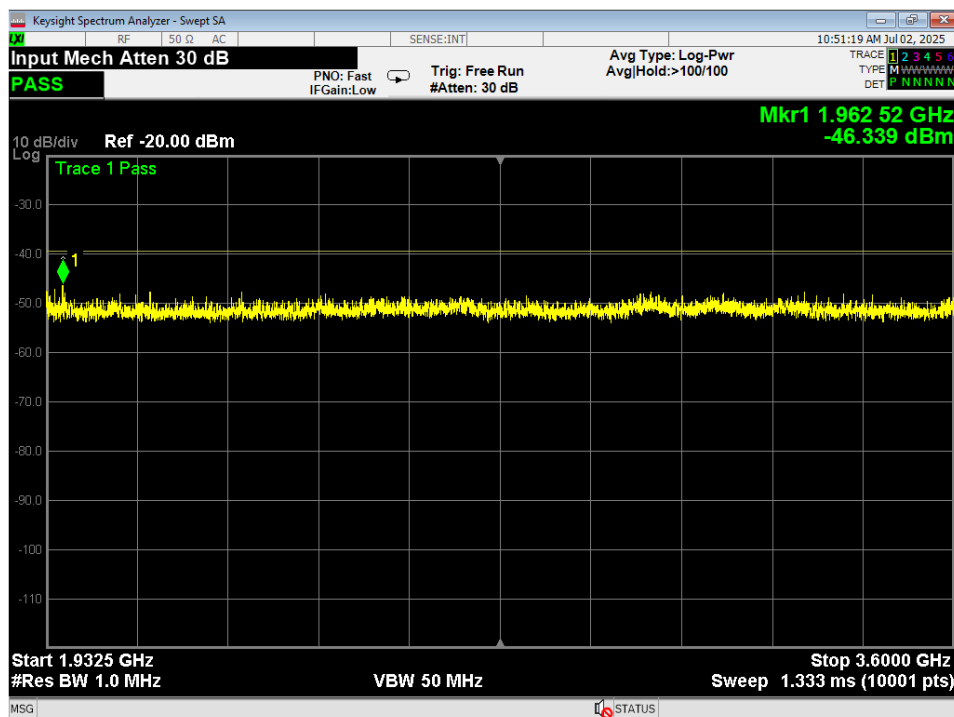


Figure 26 – Out-of-Band Spurious Emissions, 1.9325GHz – 3.6GHz, Low Channel, Ant 2

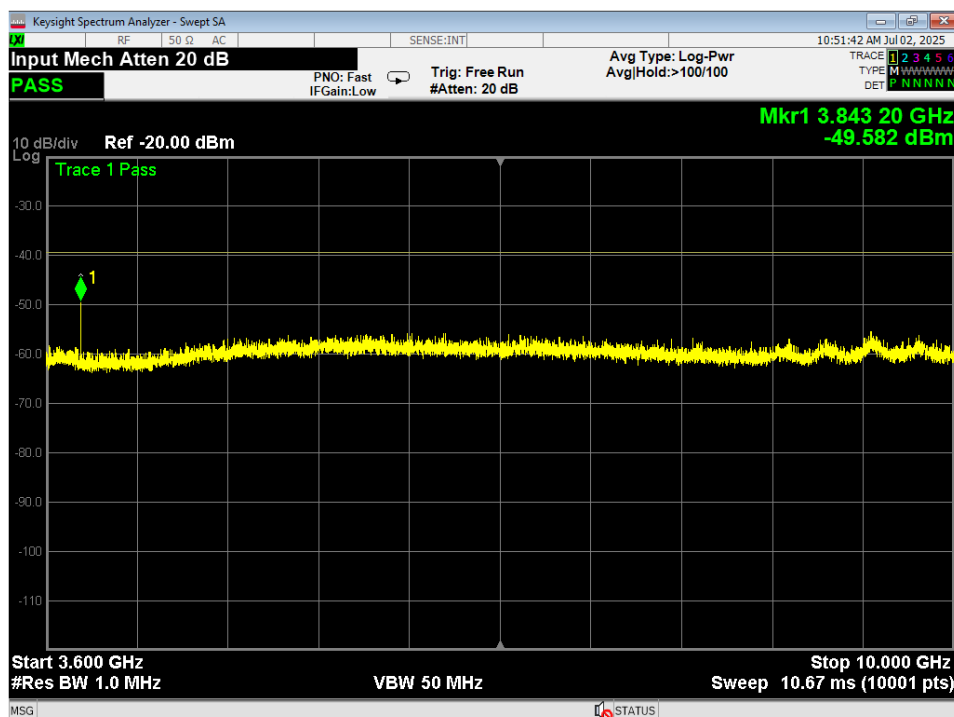


Figure 27 – Out-of-Band Spurious Emissions, 3.6GHz – 10GHz, Low Channel, Ant 2

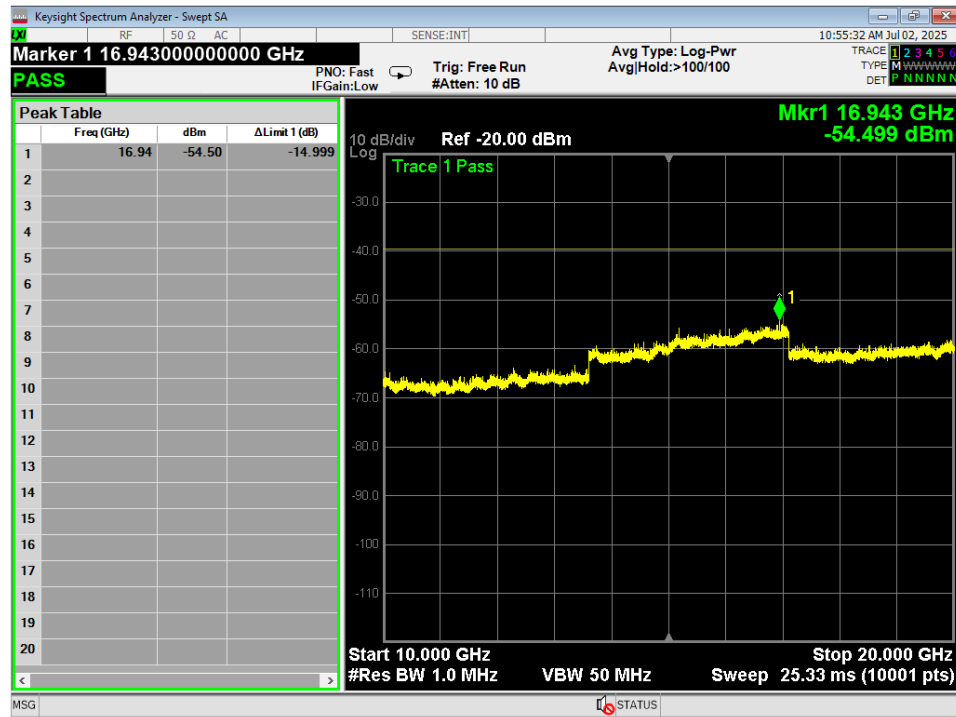


Figure 28 – Out-of-Band Spurious Emissions, 10GHz – 20GHz, Low Channel, Ant 2

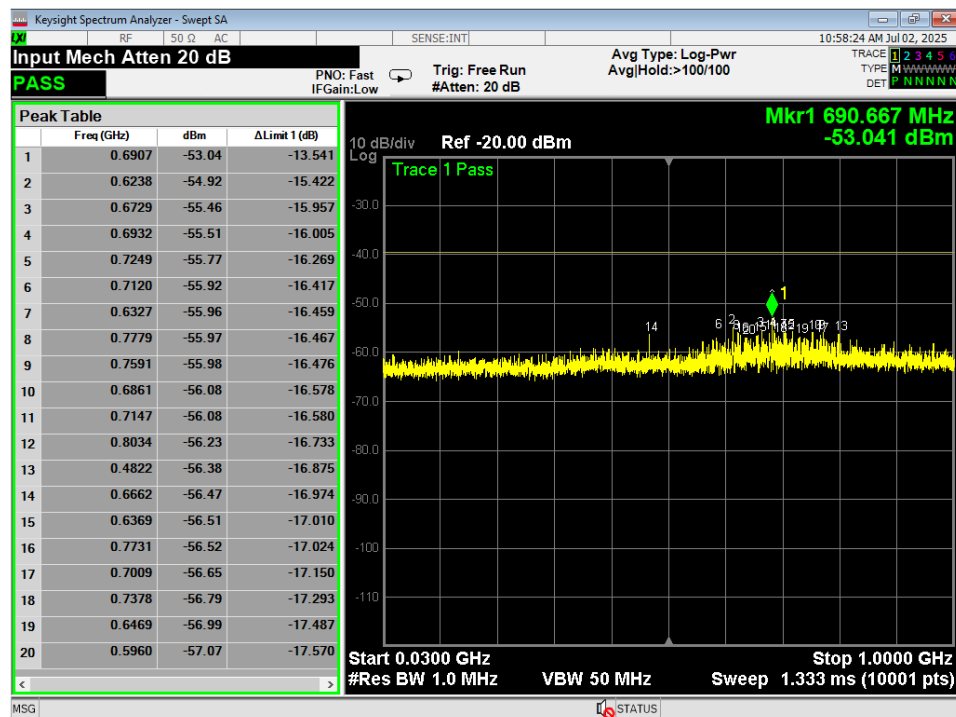


Figure 29 – Out-of-Band Spurious Emissions, 30MHz – 1GHz, High Channel, Ant 2

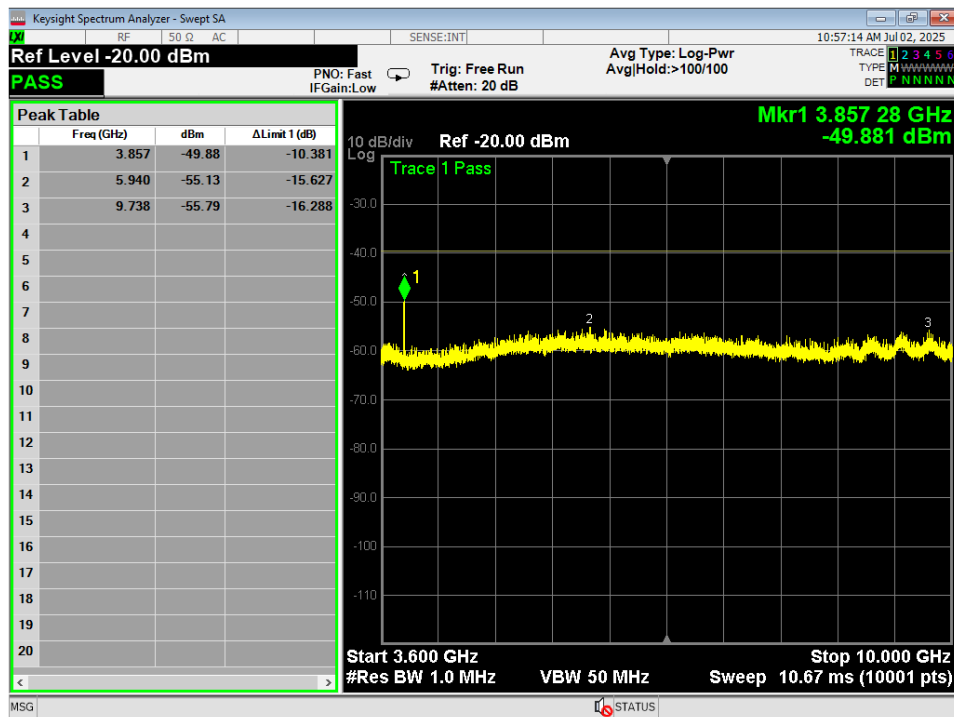


Figure 32 – Out-of-Band Spurious Emissions, 3.6GHz – 10GHz, High Channel, Ant 2



Figure 33 – Out-of-Band Spurious Emissions, 10GHz – 20GHz, High Channel, Ant 2



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4.10 RECEIVER SPURIOUS EMISSIONS

Test Method: ANSI C63.17, Section 6.1.6.2

Limits:

RSS-Gen Section 7.4

30MHz – 1GHz: 2nW = -57dBm

>1GHz: 5nW = -53dBm

Test setup:

Details can be found in section 3.4 of this report.

EUT operating conditions:

Details can be found in section 2.1 of this report.

Test results:

Pass

Frequency	Antenna	Worst Case Value	Limit	Margin
MHz		dBm	dBm	dB
30 - 1000	1	-65.350	-57	8.35
>1000	1	-59.464	-53	6.464
30 - 1000	2	-87.607	-57	30.607
>1000	2	-66.621	-53	13.621

4.11 FREQUENCY STABILITY

Test Method: ANSI C63.17 Sec. 6.2.1

Limits for Frequency Stability

10ppm

For 1921.536MHz; Limit = 19215.36Hz

For 1928.448MHz; Limit = 19284.48Hz

Test setup:

Details can be found in section 3.4 of this report.

EUT operating conditions:

Details can be found in section 2.1 of this report.

Test results:

Pass

DECT Antenna 1			
	Voltage	Frequency Error (kHz)	
Temperature (°C)	(VDC)	Ch 1	Ch 2
		1921.536 MHz	1928.448 MHz
-20°C	PoE	1.269	2.730
+20°C	PoE	3.799	-4.376
+50°C	PoE	3.446	-3.525
DECT Antenna 2			
	Voltage	Frequency Error (kHz)	
Temperature (°C)	(VDC)	Ch 1	Ch 2
		1921.536 MHz	1928.448 MHz
-20°C	PoE	-12.212	-17.440
+20°C	PoE	-12.618	-16.342
+50°C	PoE	3.544	-16.704

DECT Stability over time		
DECT Antenna 1 (Low Channel)		
Temp (°C)	Time	Frequency Error (kHz)
20°C	Start	-5.194
20°C	15 min	-5.081
20°C	30 min	-4.305
20°C	45 min	-5.609
20°C	60 min	-7.383

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4.12 FRAME-JITTER

Test Method: ANSI C63.17, Section 6.2.3

Limits for Frame Jitter

Frame Period	20ms or 10ms
Maximum Jitter (+/-)	25uS
3x StD of Jitter	12.5uS

Test setup:

Details can be found in section 3.4 of this report.

EUT operating conditions:

Details can be found in section 2.1 of this report.

Test results:

Frame Period (ms)	Max Pos Jitter (uS)	Max Neg Jitter (uS)	Max Jitter (uS)
10.00	0.00	0.01	0.10

Maximum jitter shows compliance with limits

Pass

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4.13 MONITORING THRESHOLD, LIC

Test Method: ANSI C63.17, Section 7.3.2, 7.3.3

Test setup:

Details can be found in section 3.4 of this report.

EUT operating conditions:

Details can be found in section 2.1 of this report.

Lower Threshold:

$$T_L = -174 + 10 \cdot \log(B) + M_L + P_{MAX} - P_{EUT}$$

B = Emissions Bandwidth (Hz)

M_L = dB the threshold may exceed thermal noise (30 for T_L)

$$P_{MAX} = 5 \cdot \log(B) - 10 \text{ (dBm)}$$

P_{EUT} = Transmitted Power (dBm)

Monitor Threshold	B (Hz)	M _L	P _{MAX} (dBm)	P _{EUT} (dBm)	T _L
Lower Threshold	1.188*10 ⁶	30	20.48	18.845	-81.72

Test results:

Interferer Description / Limits	Reaction of EUT	Results
Apply interference to the EUT on <i>f</i> ₁ at a level of <i>T_L</i> + <i>U_M</i> + 7 dB and on <i>f</i> ₂ at a level of <i>T_L</i> + <i>U_M</i> . Initiate transmission. The EUT should transmit on <i>f</i> ₂ . Terminate the connection. Repeat five times. If the EUT transmits once or more on any of the system carriers other than <i>f</i> ₂ , the test failed.	EUT Tx on <i>f</i> ₂	PASS
Apply interference to the EUT on <i>f</i> ₁ at a level of <i>T_L</i> + <i>U_M</i> and on <i>f</i> ₂ at a level of <i>T_L</i> + <i>U_M</i> + 7 dB. Initiate transmission. The EUT should transmit on <i>f</i> ₁ . Terminate the connection. Repeat five times. If the EUT transmits once or more on any of the system carriers other than <i>f</i> ₁ , the test failed	EUT Tx on <i>f</i> ₁	PASS
Apply interference to the EUT on <i>f</i> ₁ at a level of <i>T_L</i> + <i>U_M</i> + 1 dB and on <i>f</i> ₂ at a level of <i>T_L</i> + <i>U_M</i> - 6 dB. Initiate transmission. If the EUT transmits on <i>f</i> ₂ , terminate the connection. Repeat five times. If the EUT transmits once or more on any of the system carriers other than <i>f</i> ₂ , the test failed	EUT Tx on <i>f</i> ₂	PASS
Apply interference to the EUT on <i>f</i> ₁ at a level of <i>T_L</i> + <i>U_M</i> - 6 dB and on <i>f</i> ₂ at a level of <i>T_L</i> + <i>U_M</i> + 1 dB. Initiate transmission. If the EUT transmits on <i>f</i> ₁ , terminate the connection. Repeat five times. If the EUT transmits once or more on any of the system carriers other than <i>f</i> ₁ , the test	EUT Tx on <i>f</i> ₁	PASS

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4.14 REACTION TIME AND MONITORING INTERVAL

Test Method: ANSI C63.17, Section 7.5

Test setup:

Details can be found in section 3.4 of this report.

EUT operating conditions:

Details can be found in section 2.1 of this report.

Test Procedure:

- restrict operation of the EUT to transmit carrier frequencies f_1 and f_2 . Verify that the EUT can establish a connection either f_1 or f_2 with no interference applied on f_1 or f_2 .
- Apply time-synchronized, pulsed interference on f_1 at the pulsed level $TL + UM$ to the receive port of the EUT. Specific pulse lengths/amplitudes further described in ANSI 63.17 Section 7.5
- Additionally apply a CW signal on f_2 at the level TL to the receive port of the EUT. Verify that the EUT establishes a connection only on f_2 when the width of the interference pulse exceeds the largest of $50 \mu s$ and $50 \cdot \sqrt{(1.25/B)} \mu s$, where B is the emission bandwidth of the EUT in megahertz.
- Change the time-synchronized, pulsed interference on f_1 to the level $TL + UM + 6$ dB. Verify that the EUT establishes a connection only on f_2 when the width of the interference pulse exceeds the largest of $35 \mu s$ and $35 \cdot \sqrt{(1.25/B)} \mu s$, where B is the emission bandwidth of the EUT in megahertz.

Test results:

Test Pulse Width (μs)	Reaction from EUT	Result
$50 \cdot \sqrt{1.25/B}$	Transmission only f_2	PASS
$35 \cdot \sqrt{1.25/B}$	Transmission only f_2	PASS



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4.15 DUAL ACCESS CRITERIA

Test Method: ANSI C63.17, Section

Test setup:

Details can be found in section 3.4 of this report.

EUT operating conditions:

Details can be found in section 2.1 of this report.

Test Procedure:

See C63.17 Section 8.3.2 for test procedure.

Test results:

Test Reference C63.17 Sec 8.3.2	Reaction from EUT	Result
Transmission on interference free receive window	EUT Connected with companion during receive window	PASS
Transmission on interference free transmit window	EUT Connected with companion during transmit window	PASS

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APPENDIX A: SAMPLE CALCULATION

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor, Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF - (-CF + AG) + AV$$

where FS = Field Strength

RA = Receiver Amplitude

AF = Antenna Factor

CF = Cable Attenuation Factor

AG = Amplifier Gain

AV = Averaging Factor (if applicable)

Assume a receiver reading of 55 dB μ V is obtained. The Antenna Factor of 12 and a Cable Factor of 1.1 is added. The Amplifier Gain of 20 dB is subtracted, giving a field strength of 48.1 dB μ V/m.

$$FS = 55 + 12 - (-1.1 + 20) + 0 = 48.1 \text{ dB}\mu\text{V/m}$$

The 48.1 dB μ V/m value can be mathematically converted to its corresponding level in μ V/m.

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm} [(48.1 \text{ dB}\mu\text{V/m})/20] = 254.1 \mu\text{V/m}$$

AV is calculated by taking the $20 \cdot \log(T_{\text{on}}/100)$ where T_{on} is the maximum transmission time in any 100ms window.

EIRP Calculations

In cases where direct antenna port measurement is not possible or would be inaccurate, output power is measured in EIRP. The maximum field strength is measured at a specified distance and the EIRP is calculated using the following equation.

$$EIRP (\text{Watts}) = [\text{Field Strength (V/m)} \times \text{antenna distance (m)}]^2 / 30$$

$$\text{Power (watts)} = 10^{[\text{Power (dBm)}]/10} / 1000$$

$$\text{Voltage (dB}\mu\text{V)} = \text{Power (dBm)} + 107 \text{ (for } 50\Omega \text{ measurement systems)}$$

$$\text{Field Strength (V/m)} = 10^{[\text{Field Strength (dB}\mu\text{V/m)} / 20] / 10^6}$$

$$\text{Gain} = 1 \text{ (numeric gain for isotropic radiator)}$$

$$\text{Conversion from 3m field strength to EIRP (d=3):}$$

$$EIRP = [FS(\text{V/m}) \times d^2]/30 = FS [0.3] \quad \text{for } d = 3$$

$$EIRP(\text{dBm}) = FS(\text{dB}\mu\text{V/m}) - 10(\log 10^9) + 10\log[0.3] = FS(\text{dB}\mu\text{V/m}) - 95.23$$

$$10\log(10^9) \text{ is the conversion from micro to milli}$$



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APPENDIX B – MEASUREMENT UNCERTAINTY

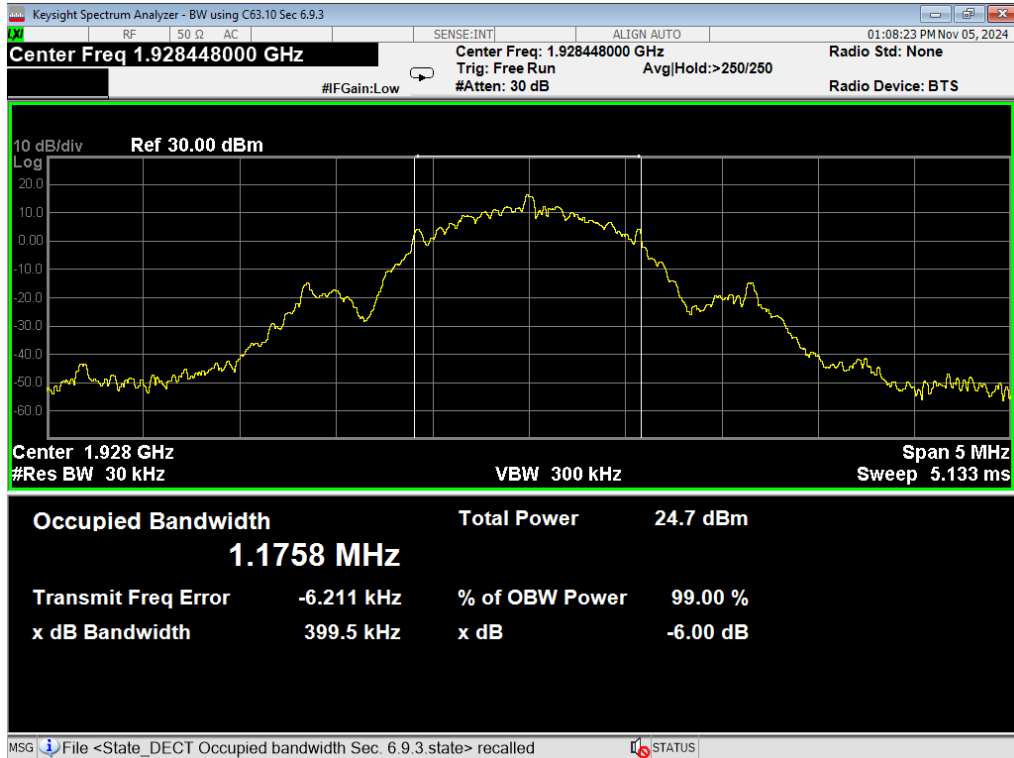
NCEE Labs does not add uncertainty levels to measurement levels

Where relevant, the following measurement uncertainty levels have been for tests performed in this test report:

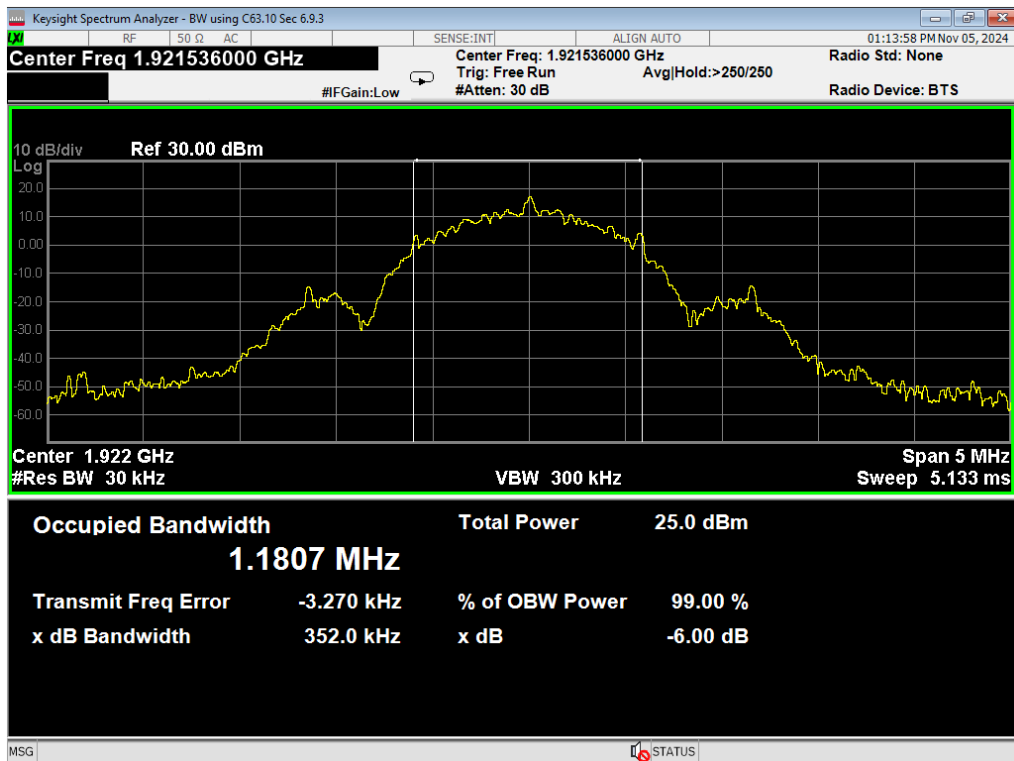
Test	Frequency Range	Uncertainty Value (dB)
Radiated Emissions, 3m	30MHz - 1GHz	±4.31
Radiated Emissions, 3m	1GHz - 18GHz	±5.08
Emissions limits, conducted	30MHz – 18GHz	±3.03

Expanded uncertainty values are calculated to a confidence level of 95%.

APPENDIX C – GRAPHS AND TABLES

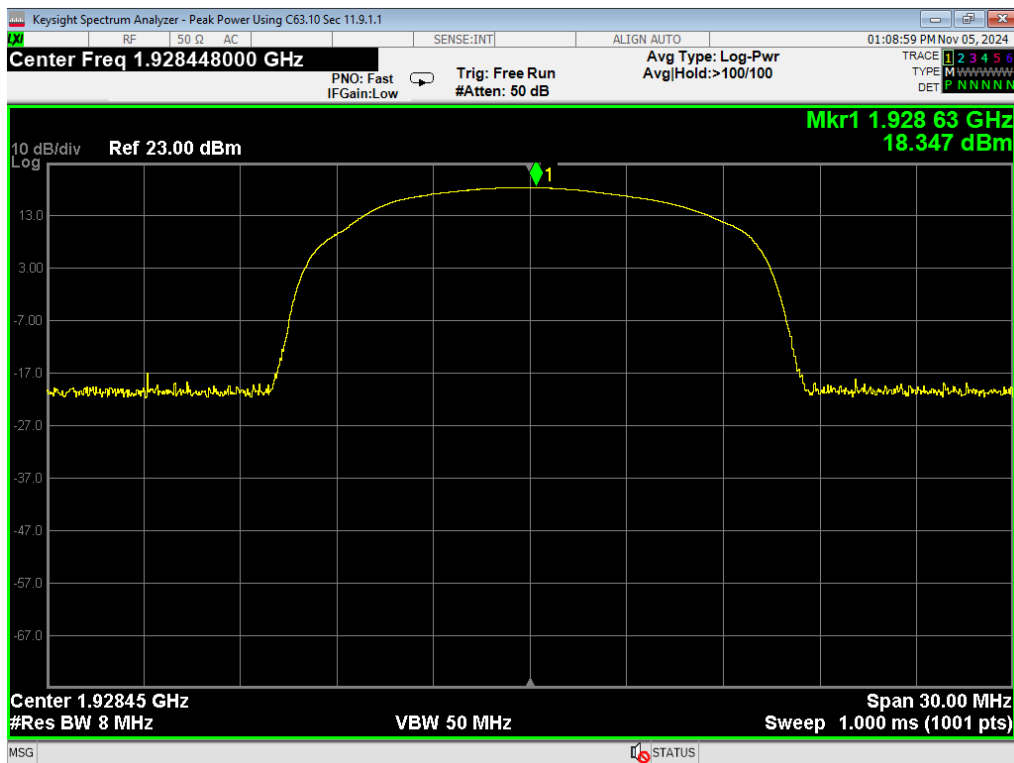


01 OBW, DECT, Antenna 1, High

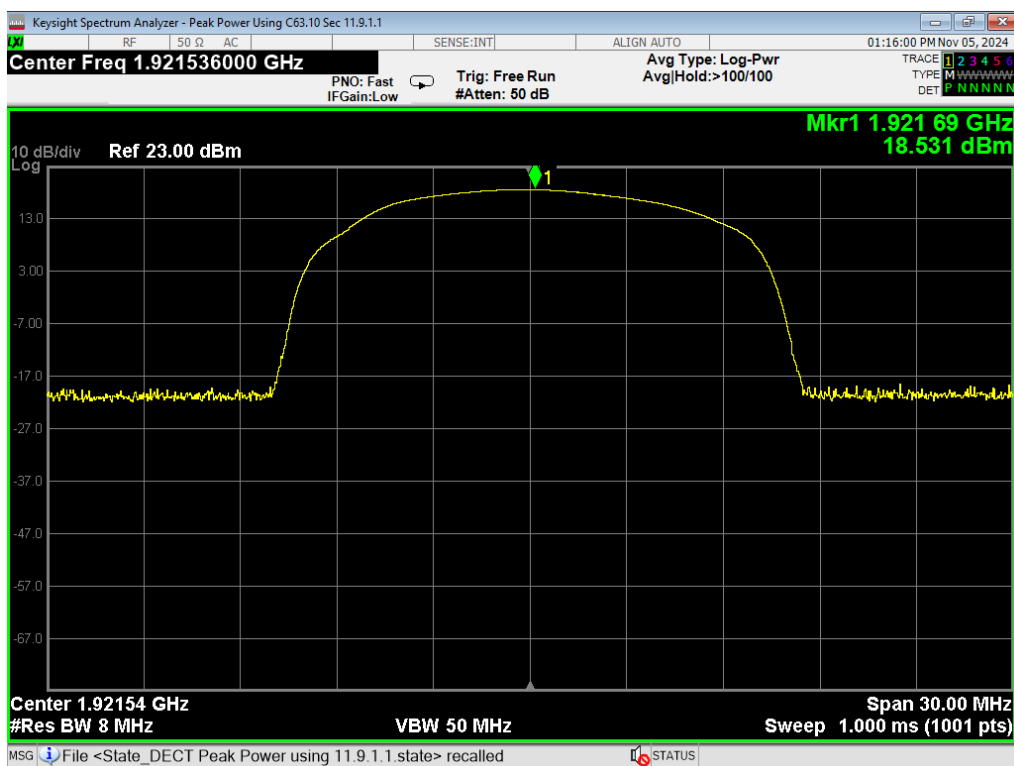


02 OBW, DECT, Antenna 1, Low

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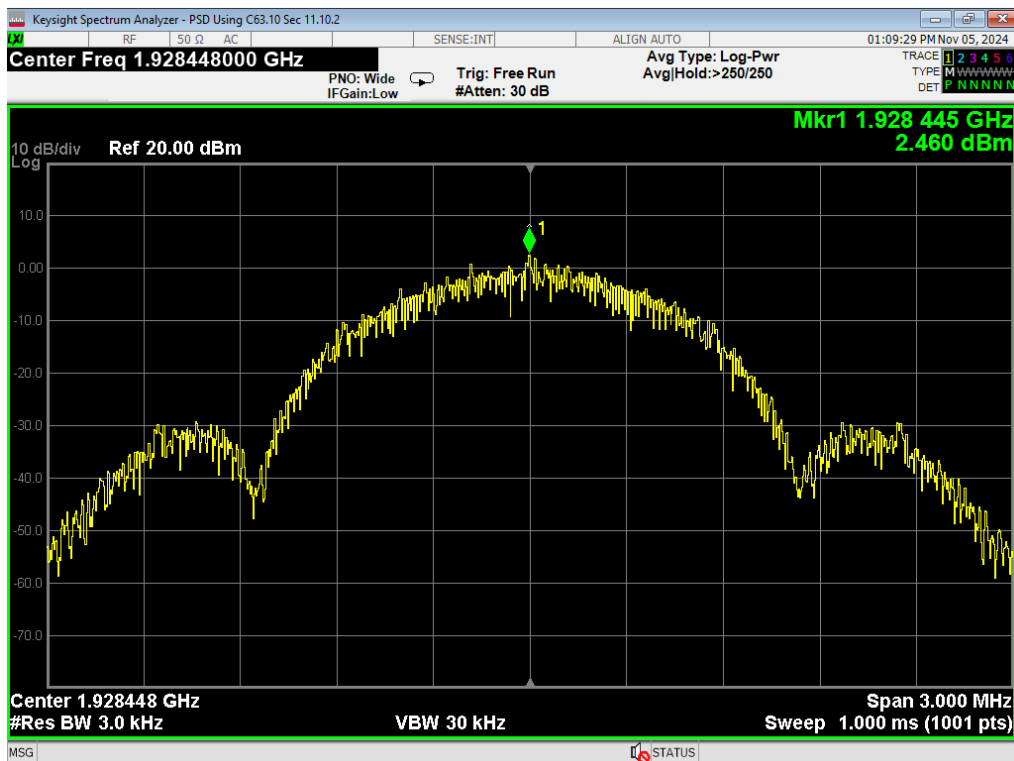


03 Peak Power, DECT, Antenna 1, High

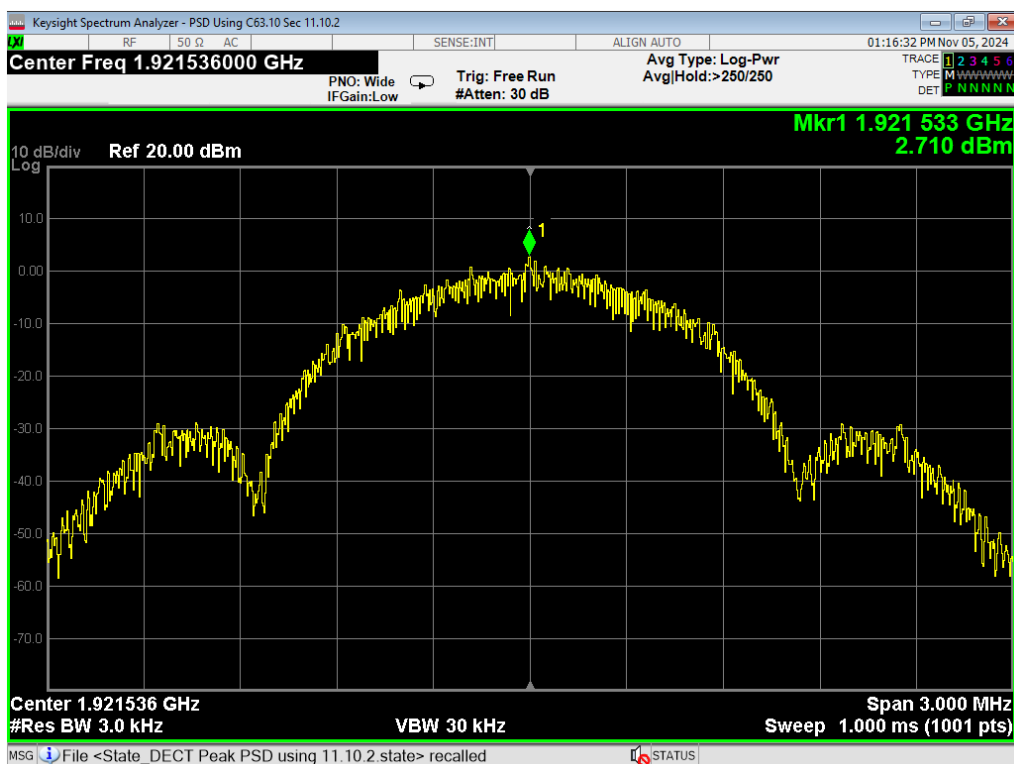


04 Peak Power, DECT, Antenna 1, Low

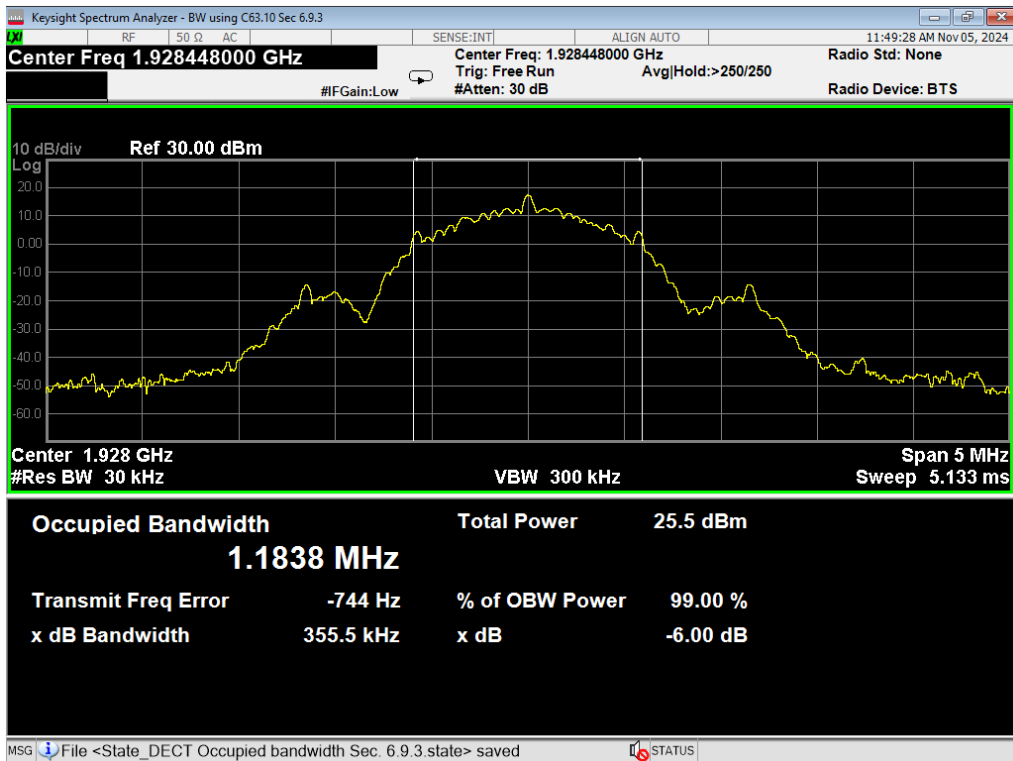
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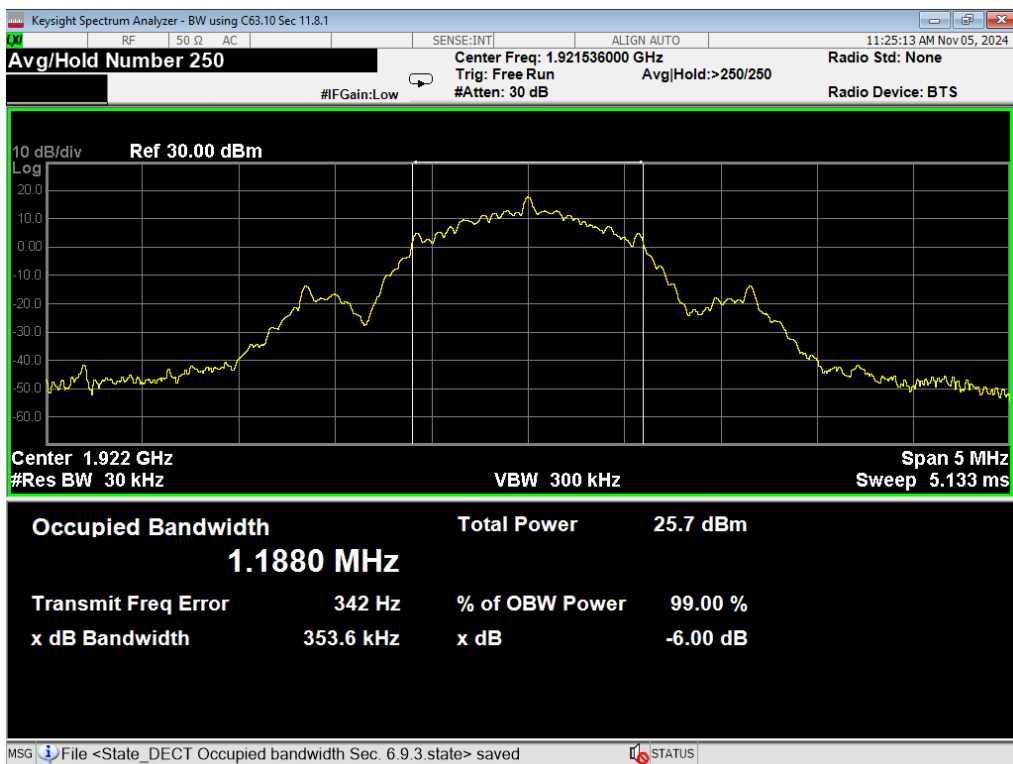
05 Peak PSD, DECT, Antenna 1, High



06 Peak PSD, DECT, Antenna 1, Low

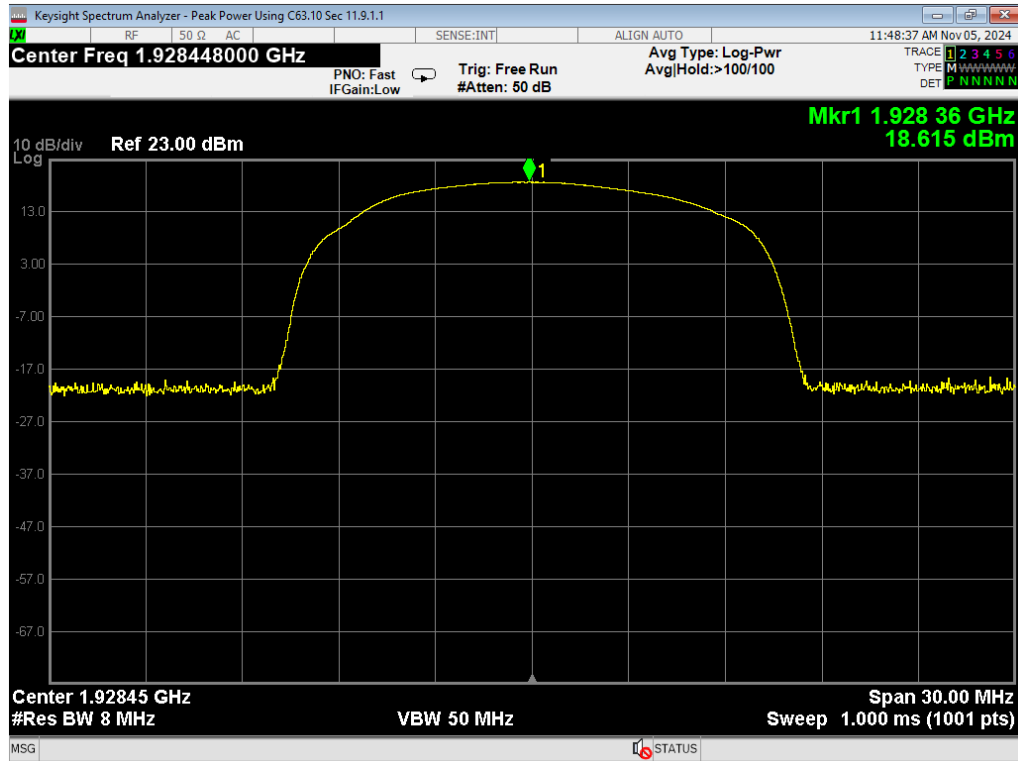


07 OBW, DECT, Antenna 2, High

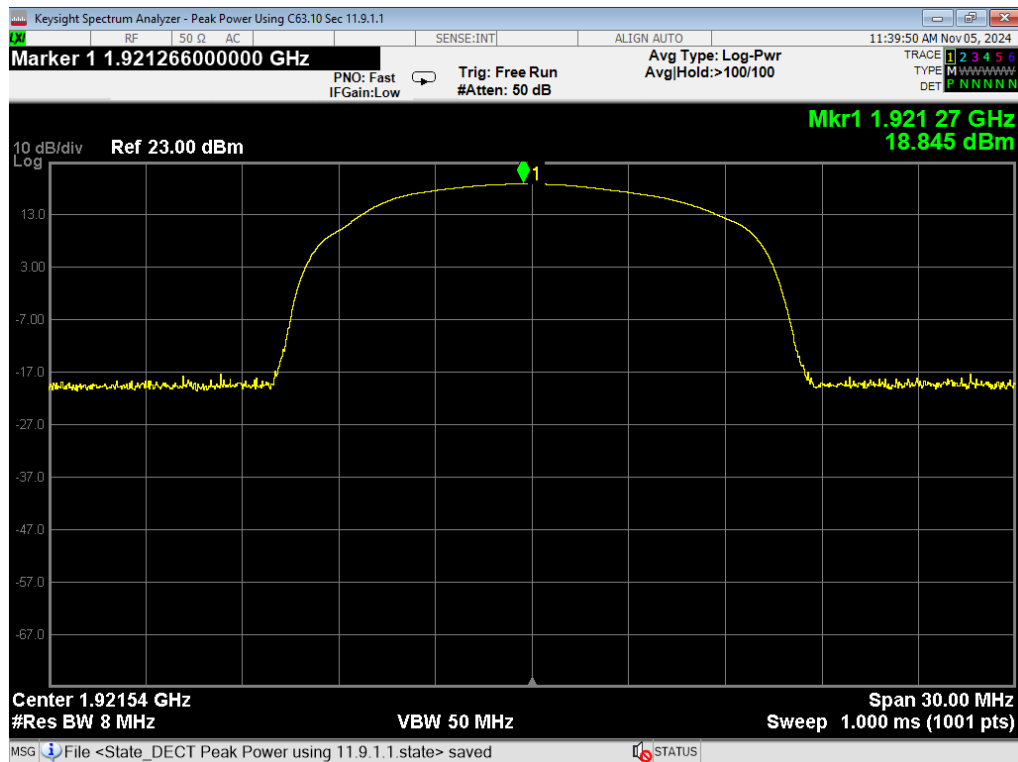


08 OBW, DECT, Antenna 2, Low

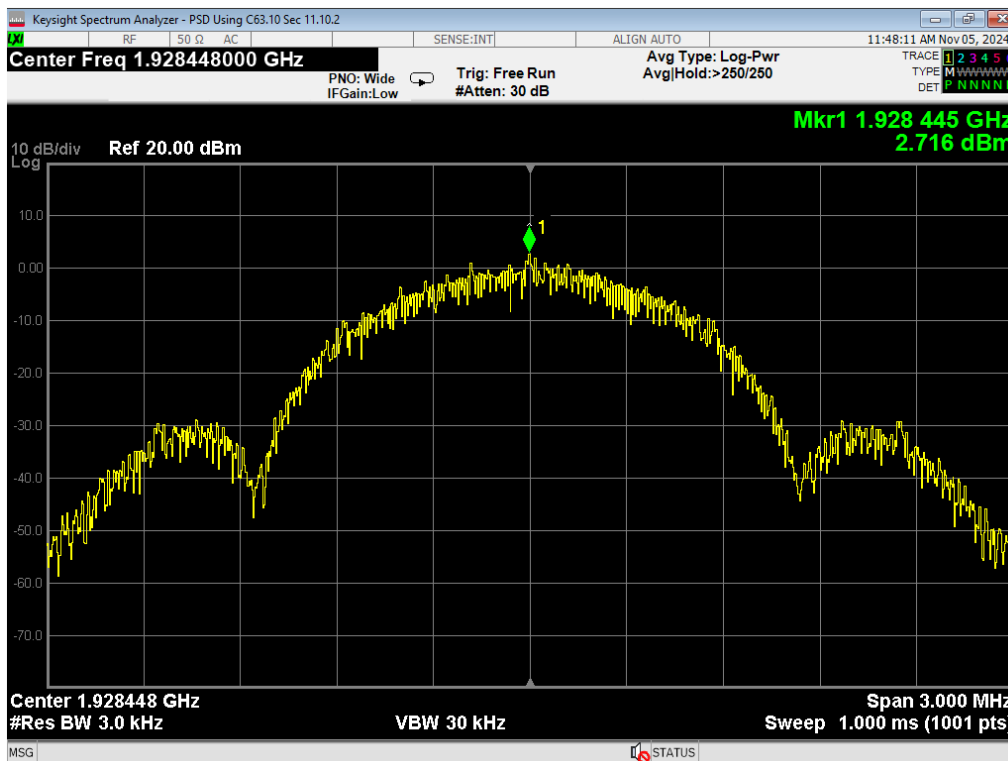
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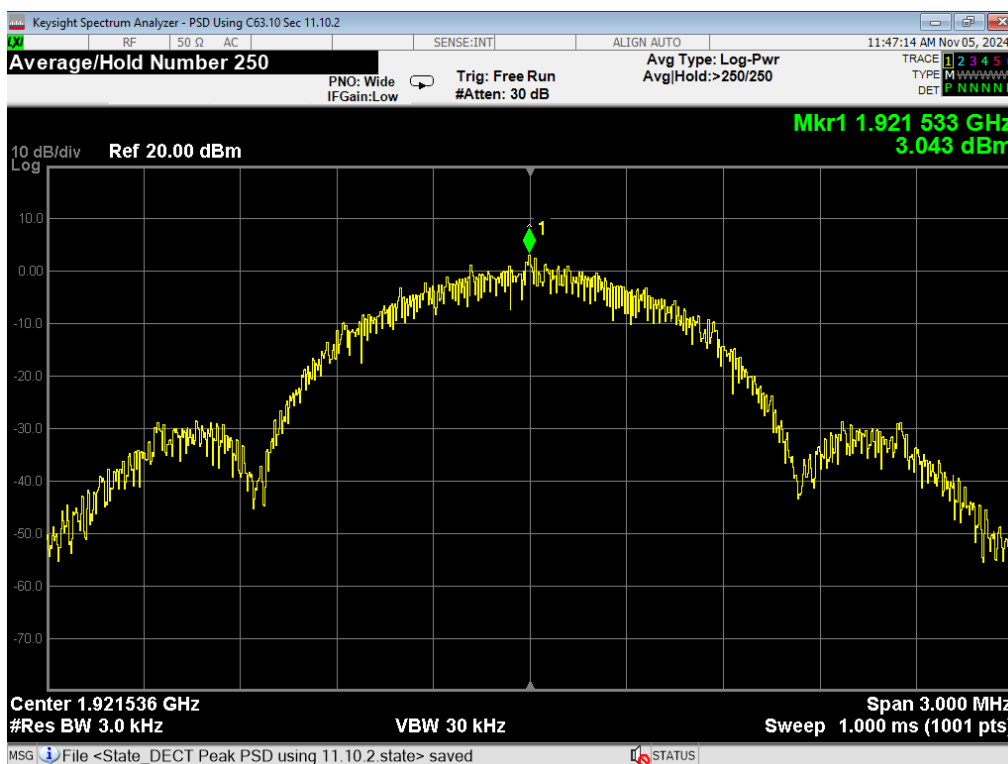
09 Peak Power, DECT, Antenna 2, High



10 Peak Power, DECT, Antenna 2, Low



11 Peak PSD, DECT, Antenna 2, High



12 Peak PSD, DECT, Antenna 2, Low



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