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Product Compliance Solutions

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FCC/ISED Test Report

Prepared for: **Bosch Security Systems, LLC**

Address: **3401 Village Drive, Suite 110**
Lincoln NE 68516

Product: **TR-1000**

Test Report No: **R20240829-00-E6** **Rev: B**

Approved by:

Fox Lane,
EMC Test Engineer

DATE: **August 18, 2025**

Total Pages: **52**

REVISION PAGE

Rev. No.	Date	Description
0	30 July 2025	Issued by FLane Prepared by Flane
B	18 August 2025	Updated Limit references – FL

CONTENTS

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	NA*

*Device is battery powered

2.0 EUT DESCRIPTION

2.1 EQUIPMENT UNDER TEST

Summary and Operating Condition:

EUT	TR-1000
FCC ID	B5DM546
IC ID	1321A-TR1000
EUT Received	4 November 2024
EUT Tested	4 November 2024- 2 July 2025
Serial No.	C1_37 C1_40
Operating Band	1920 – 1930 MHz
Device Type	☐ GMSK ☐ GFSK ☐ BT BR ☐ BT EDR 2MB ☐ BT EDR 3MB ☐ 802.11x ☒ DECT
Power Supply / Voltage	BP battery (removable): Li-ion, 3.7V, 6850mAh

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.

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 ± 4%
Temperature of 22 ± 3° 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.

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 MEASUREMNTS

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.

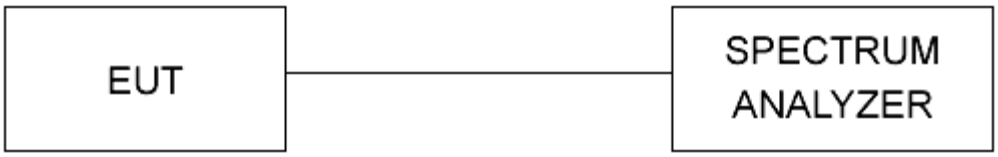

Figure 1 - Bandwidth Measurements Test Setup

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.

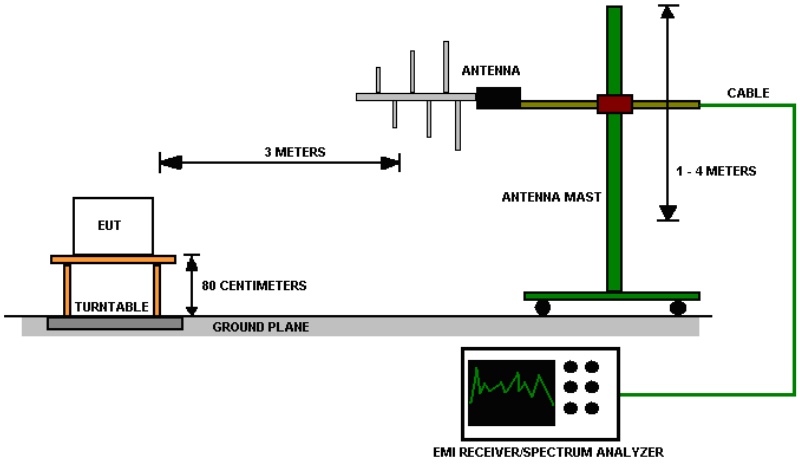

Figure 2 - Radiated Emissions Test Setup

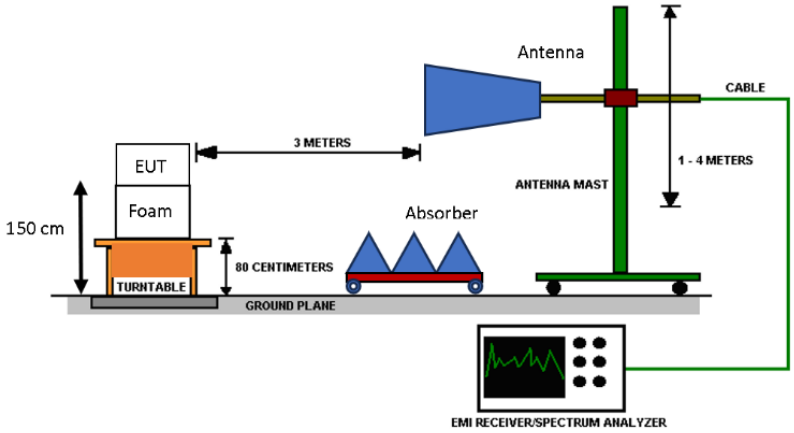

Figure 3 - Radiated Emissions Test Setup, >1GHz

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	1190.0	2.641	19.219	**83.541**	PASS
High	Ant 1	1188.5	2.609	19.121	**81.677**	PASS
Low	Ant 2	1203.0	2.757	19.394	**86.976**	PASS
High	Ant 2	1197.1	2.824	19.244	**84.023**	PASS
Occupied Bandwidth Lim = 50kHz < X < 2.5MHz				Peak Output Power Lim = see Sec 4.1; PSD Lim = 3mW/4.77dBm		

4.1 OUTPUT POWER

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

Limits of power measurements:
100uW * √[BW(Hz)]
100 * √(1.203*10^6) = 109681.3567uW = 109.6813567mW = 20.401dBm

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.

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.

4.3 DUTY CYCLE

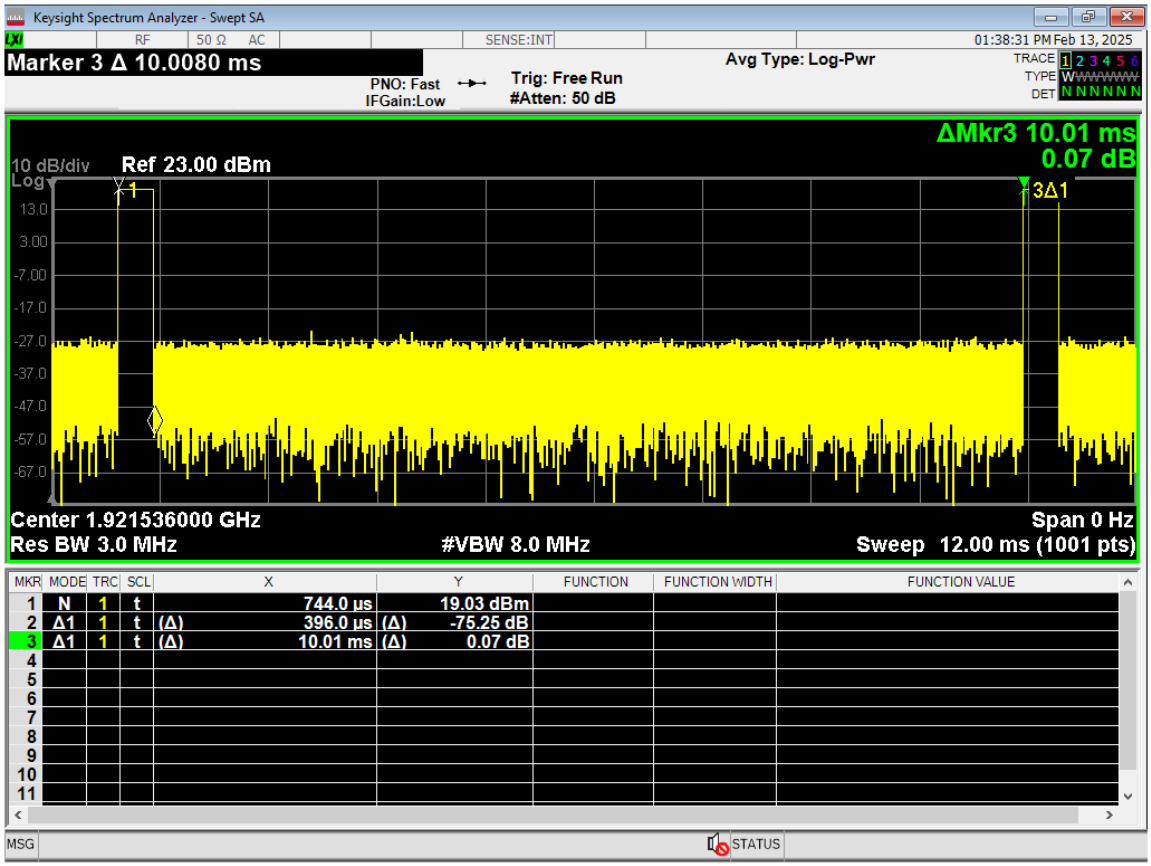

Figure 4 – DECT Duty Cycle

Duty Cycle = 3.956% = 0.03956

DCCF (For Emissions) = 20*log(1/0.03956) = **28.055dB**
DCCF (For Power) = 10*log(1/0.03956) = **14.027dB**

4.4 RADIATED EMISSIONS

Test Method:
ANSI C63.10-2020, Section 8

Limits for radiated emissions measurements:
FCC 15.209 limits (for transmitter spurious emissions) (DECT does not need to be below 15.209 limits but they are used for referential purposes)

NOTE:
1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 * log * Emission level (μV/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.

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 5 - Radiated Emissions Plot, DECT, with Headset

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.

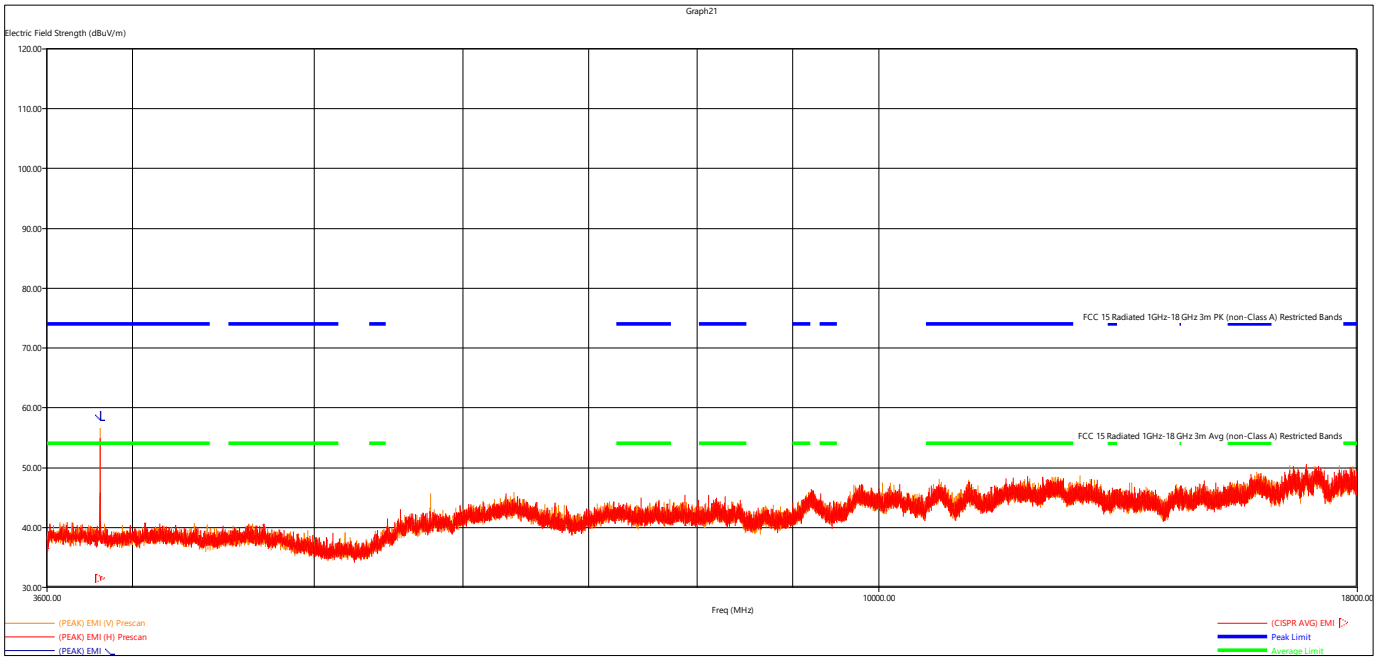

Figure 6 - Radiated Emissions Plot, DECT, Ant 1, Low, 3.6GHz-18GHz

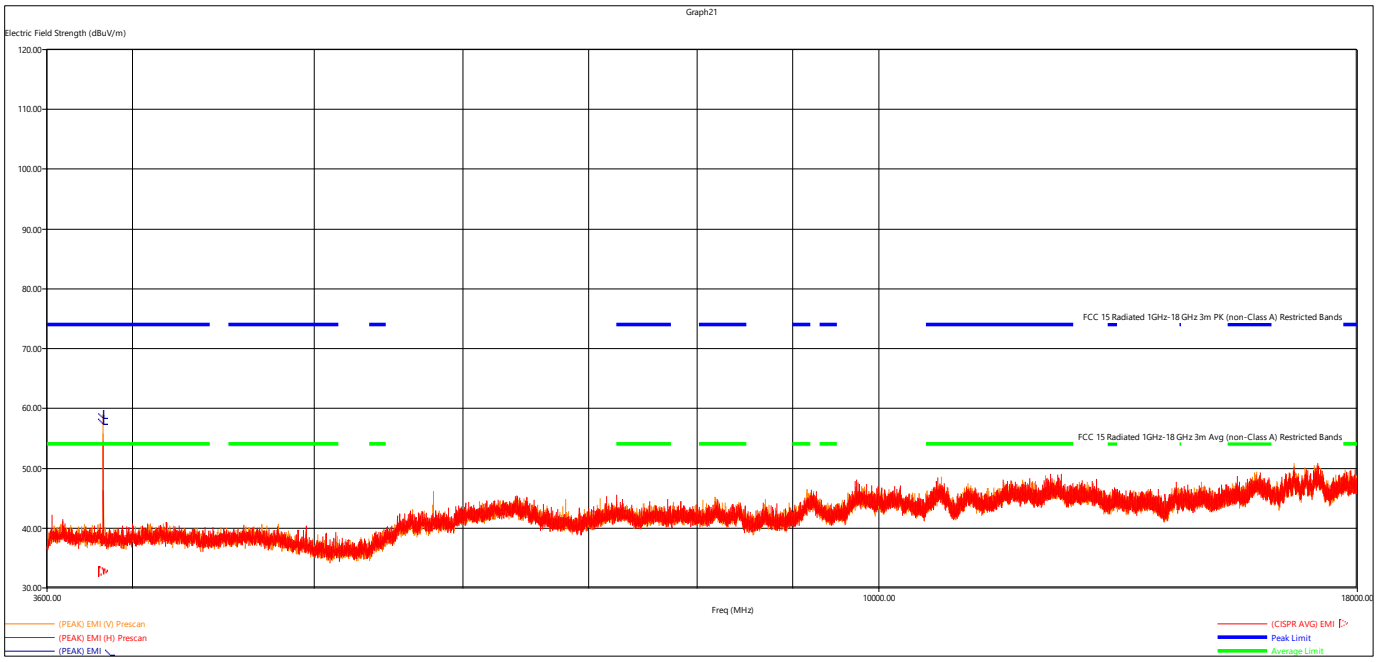

Figure 7 - Radiated Emissions Plot, DECT, Ant 1, High, 3.6GHz-18GHz

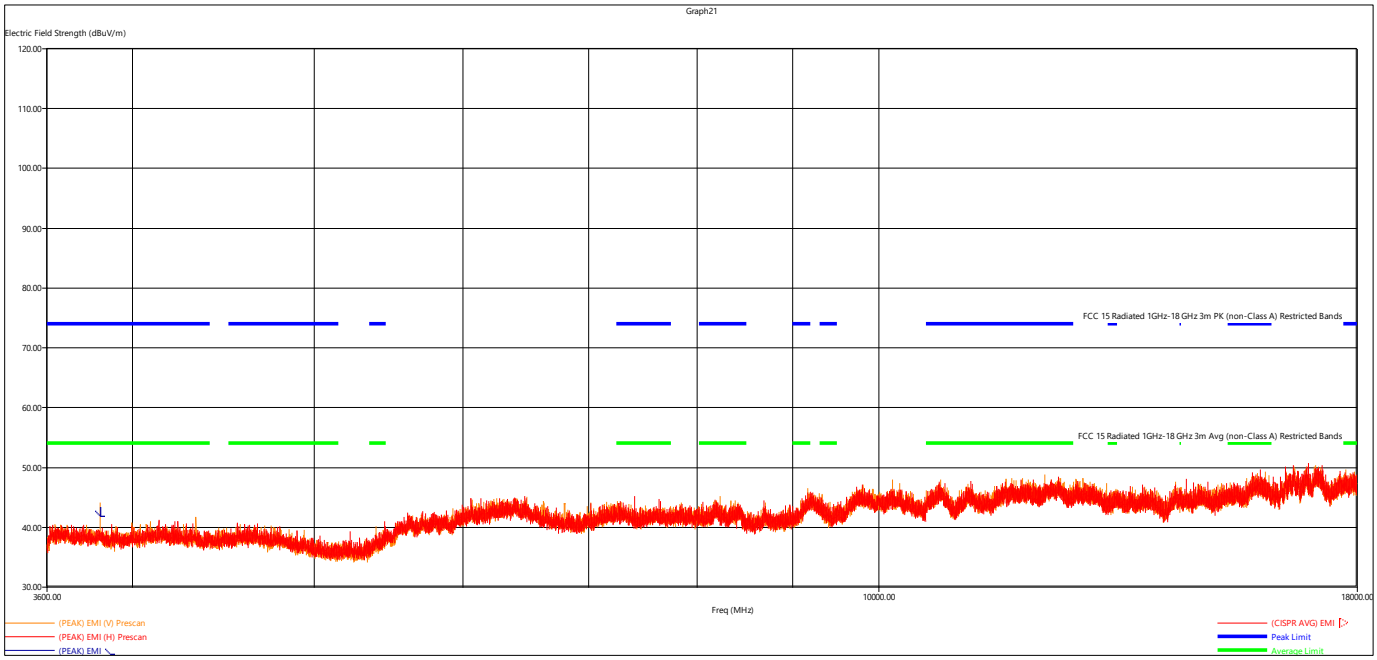

Figure 8 - Radiated Emissions Plot, DECT, Ant 2, Low, 3.6GHz-18GHz

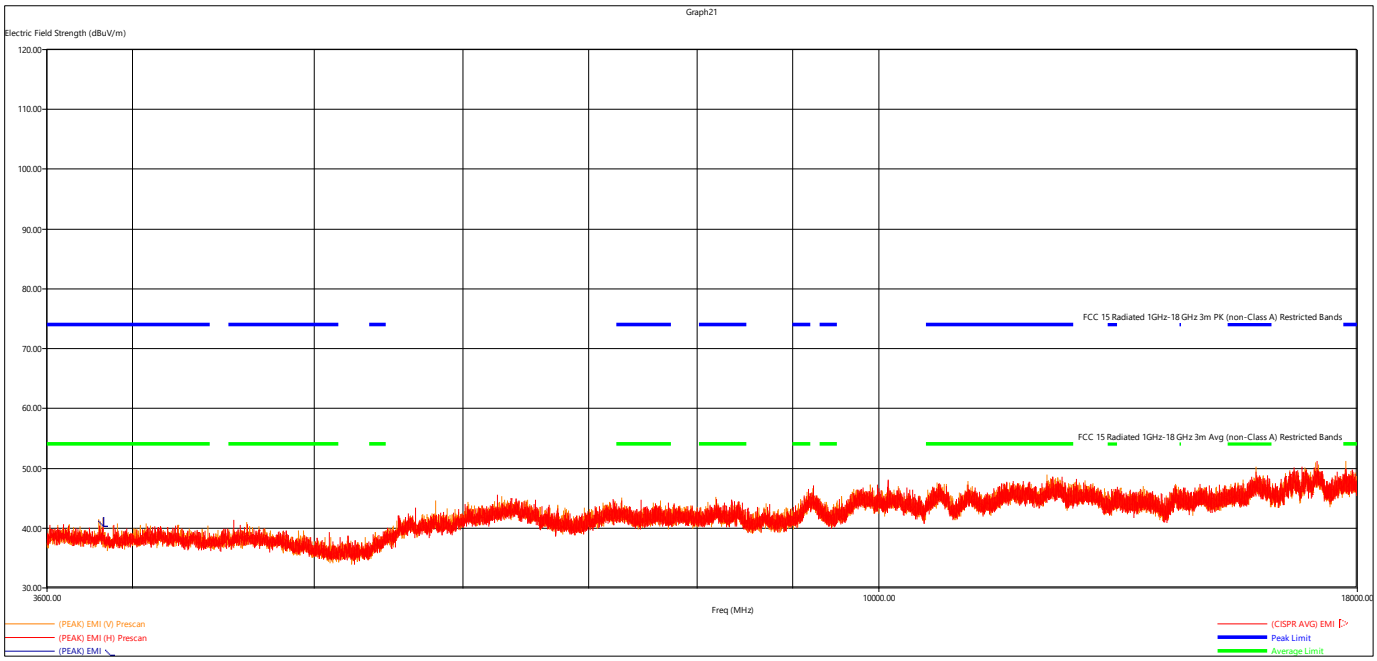

Figure 9 - Radiated Emissions Plot, DECT, Ant 2, High, 3.6GHz-18GHz

No emissions pertaining to RF transmitter were found from 30MHz – 1GHz and were not tabulated. Device was investigated with and without module active, no discernable difference was noted.
Intermodulation with other transmitters in device were investigated and found to be compliant.
The EUT was maximized in all 3 orthogonal axes..

Peak Measurements, >1GHz								
Frequency	**Level**	**Limit**	**Margin**	**Height**	**Angle**	**Pol**	**Ant.**	**Ch.**
MHz	**dBµV/m**	**dBµV/m**	**dB**	**cm.**	**deg.**			
3842.236000	58.56	73.98	15.42	249.16	27.50	V	1	Low
3856.694000	59.01	73.98	14.97	274.65	20.75	V	1	High
3856.840000	57.94	73.98	16.04	301.10	21.50	V	1	High
3842.496000	42.49	73.98	31.49	337.88	294.75	V	2	Low
3855.712000	40.97	73.98	33.01	147.85	359.50	V	2	High

Average Measurements, >1GHz								
Frequency	**Level**	**Limit**	**Margin**	**Height**	**Angle**	**Pol**	**Ant.**	**Ch.**
MHz	**dBµV/m**	**dBµV/m**	**dB**	**cm.**	**deg.**			
3842.236000	30.505	53.98	23.475	249.16	27.50	V	1	Low
3856.694000	30.955	53.98	23.025	274.65	20.75	V	1	High
3856.840000	29.885	53.98	24.095	301.10	21.50	V	1	High
3842.496000	14.435	53.98	39.545	337.88	294.75	V	2	Low
3855.712000	12.915	53.98	41.065	147.85	359.50	V	2	High
Average level = Peak Level – DCCF (for emissions) For more information regarding DCCF, see section 4.3								

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 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:

Pass

Reaction	Test
connection lost	Battery pack removed from EUT
connection lost	Power removed from companion device (comm. anaylzer)
connection lost	EUT turned off
connection lost	companion device turned off (powered off)

4.7 IN-BAND EMISSIONS

Test Method: ANSI C63.17, Section 6.1.6.1

Limits:

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

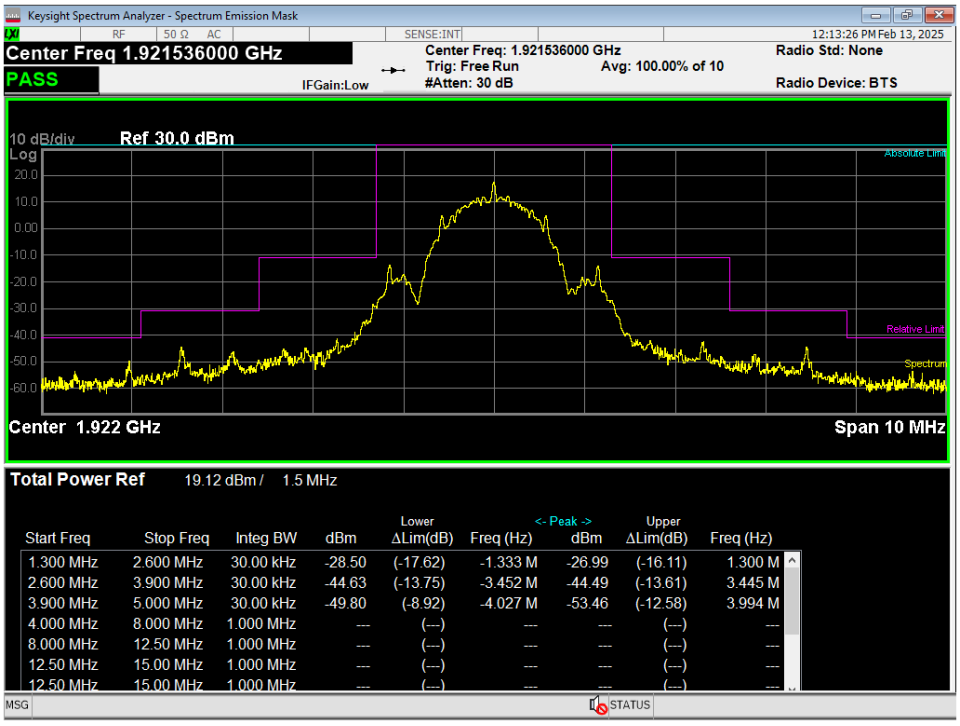

Figure 10 – In-Band Spurious Emissions, Low Channel, Antenna 1

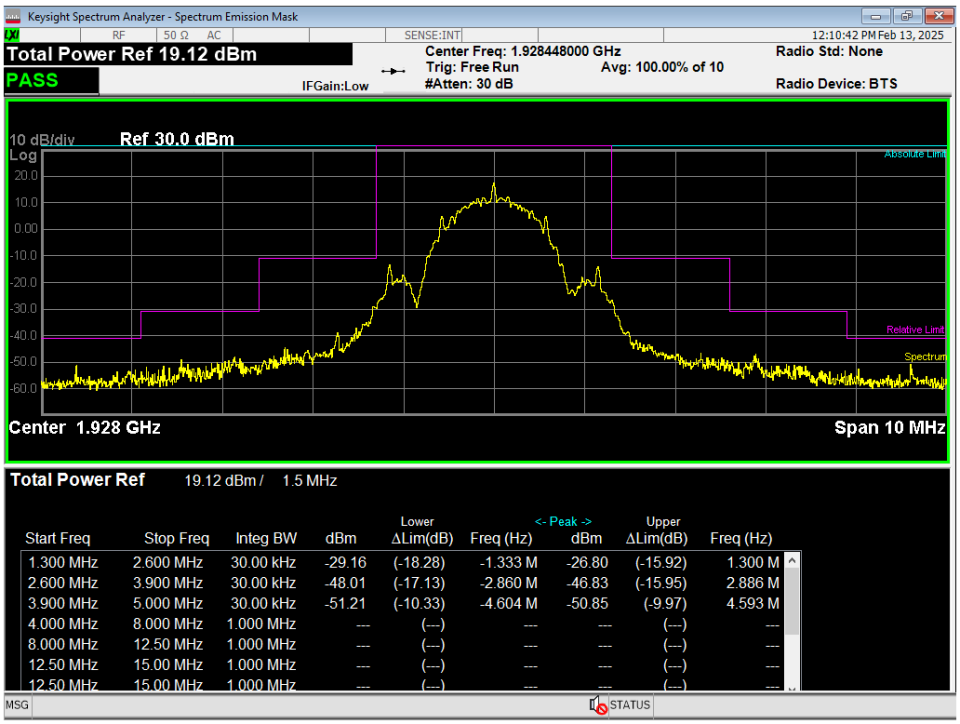

Figure 11 – In-Band Spurious Emissions, High Channel, Antenna 1

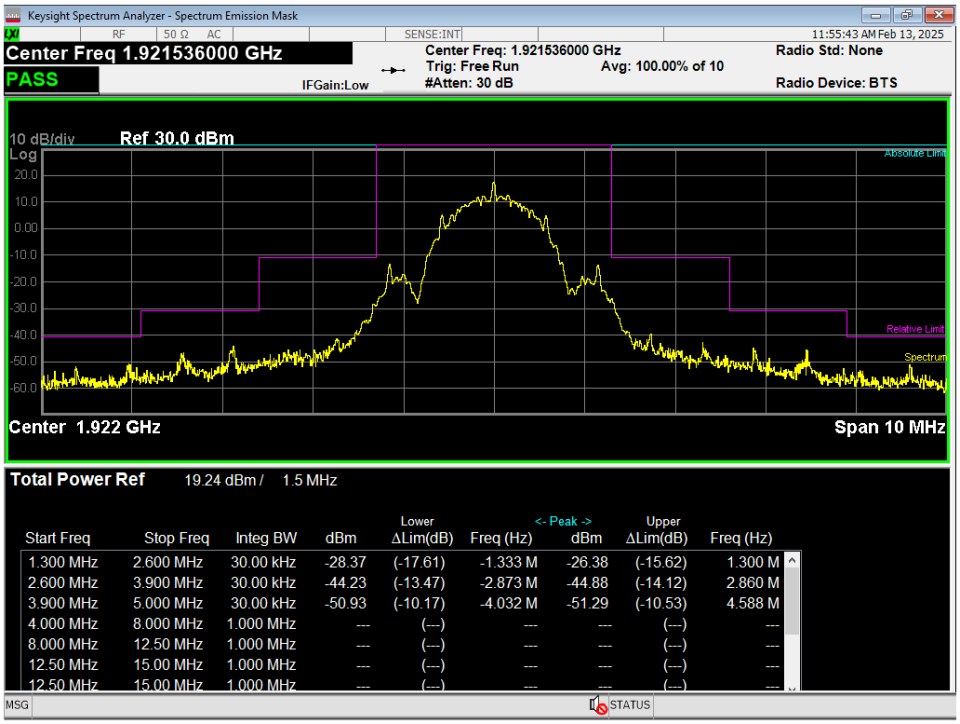

Figure 12 – In-Band Spurious Emissions, Low Channel, Antenna 2

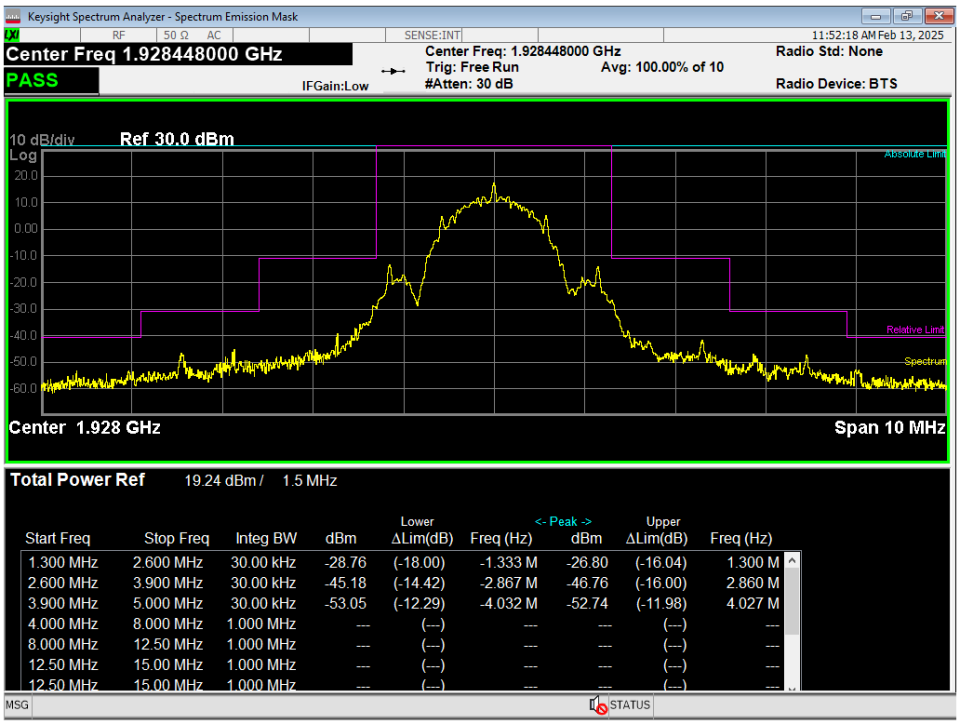

Figure 13 – In-Band Spurious Emissions, High Channel, Antenna 2

4.8 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 ≤ 1.25 MHz outside UPCS band:	≤ -9.5 dBm
1.25 MHz ≤ f ≤ 2.5 MHz outside UPCS band:	≤ -29.5 dBm
f ≥ 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.

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Test results:
Pass

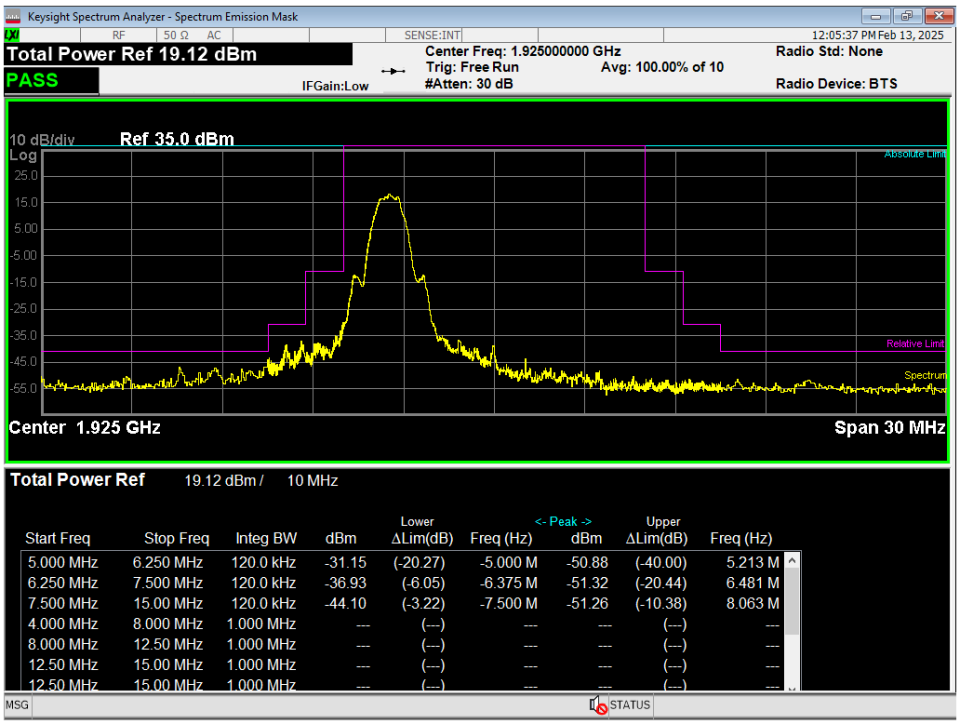

Figure 14 – Out-of-Band Spurious Emissions, Low Channel, Ant 1

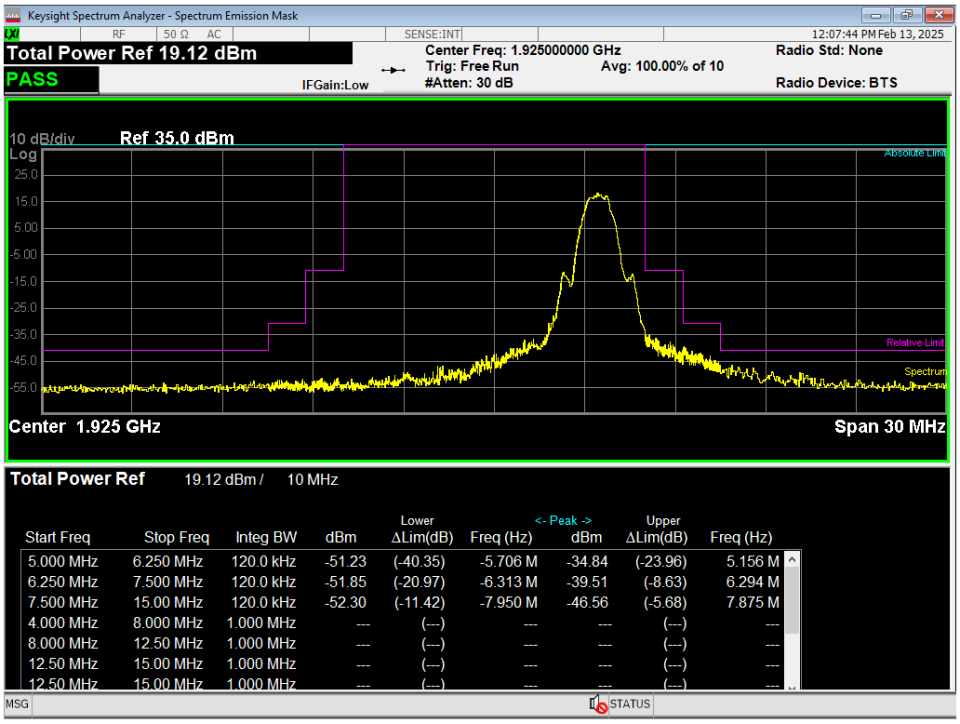

Figure 15 – Out-of-Band Spurious Emissions, High Channel, Ant 1

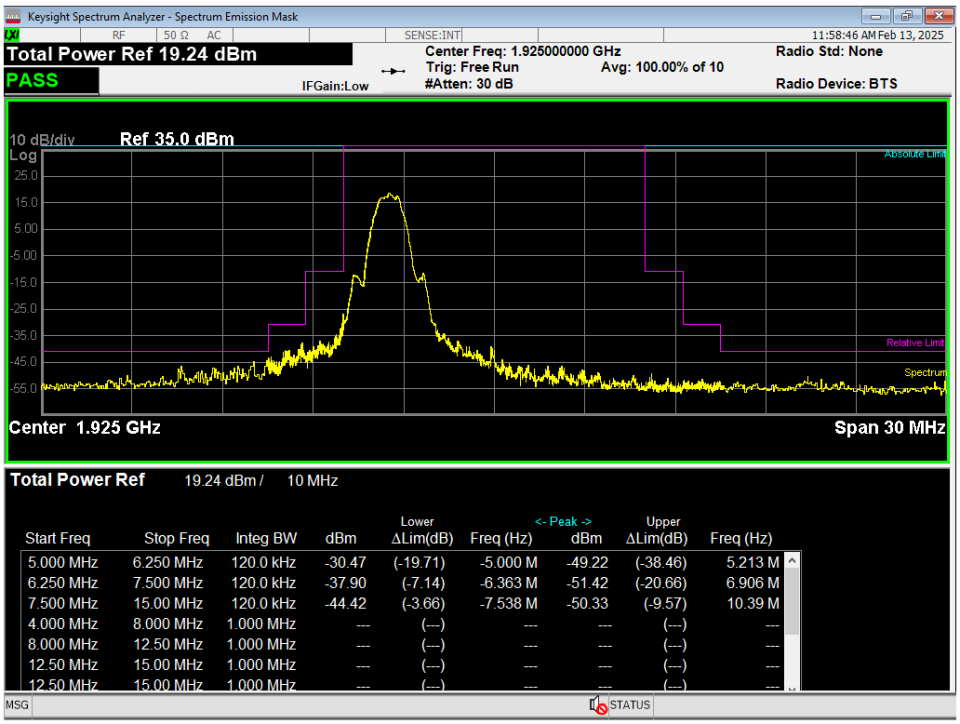

Figure 16 – Out-of-Band Spurious Emissions, Low Channel, Ant 2

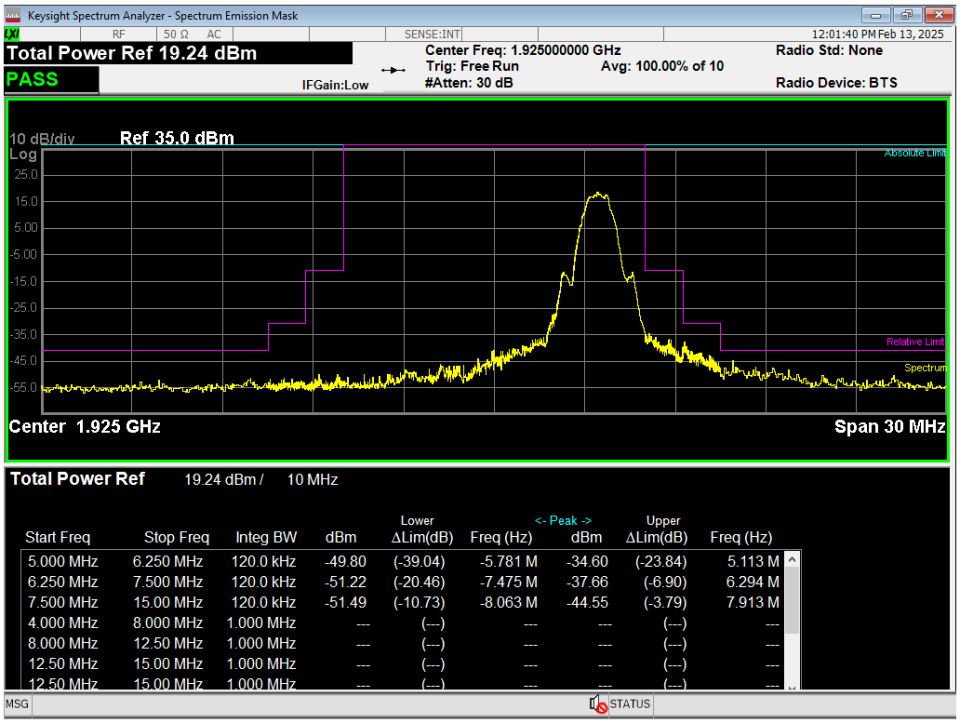

Figure 17 – Out-of-Band Spurious Emissions, High Channel, Ant 2

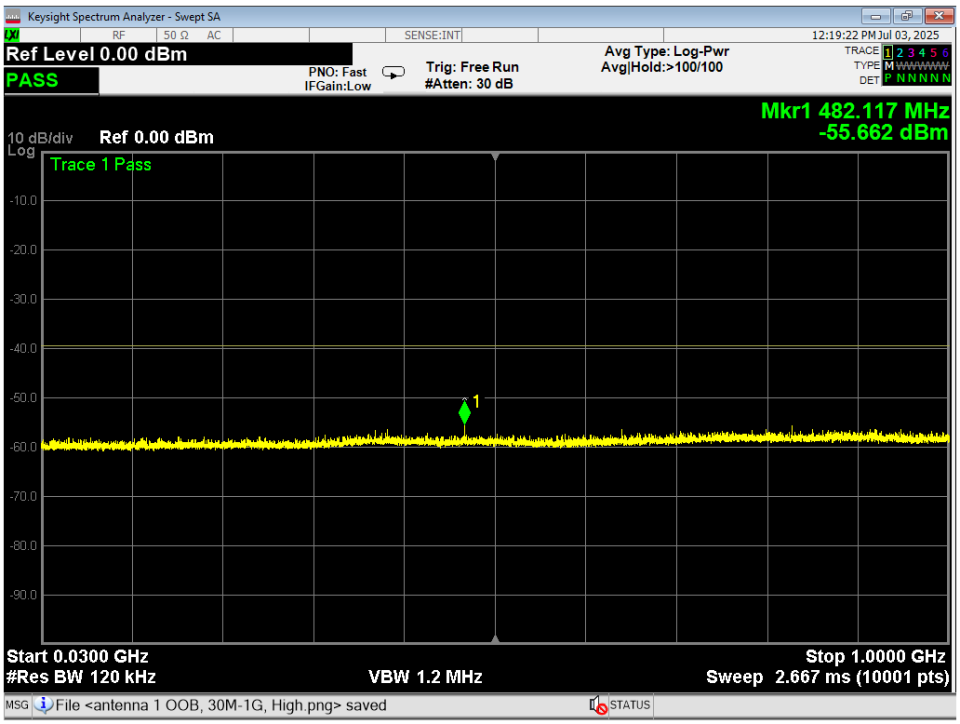

Figure 18 – Out-of-Band Spurious Emissions, 30MHz – 1GHz, Low Channel, Ant 1

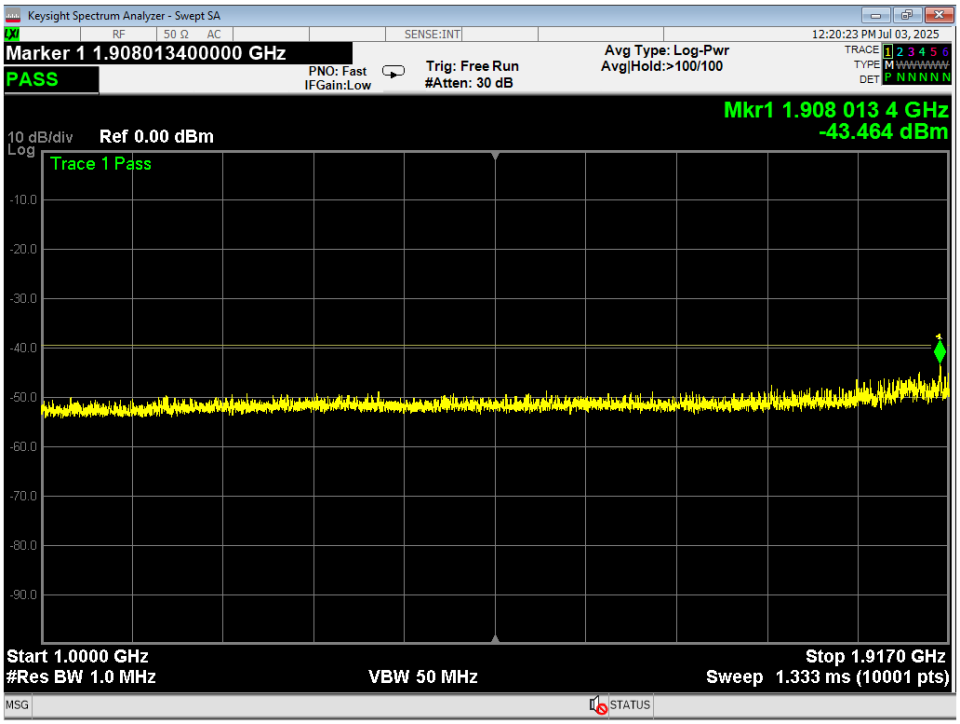

Figure 19 – Out-of-Band Spurious Emissions, 1GHz – 1.917GHz, Low Channel, Ant 1

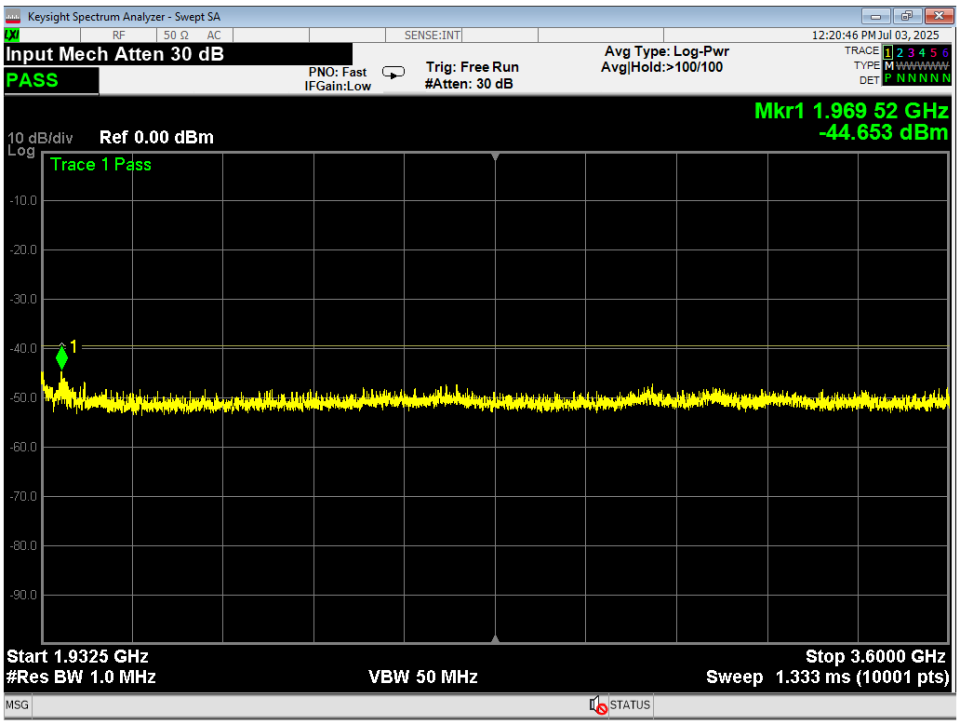

Figure 20 – Out-of-Band Spurious Emissions, 1.9325GHz – 3.6GHz, Low Channel, Ant 1

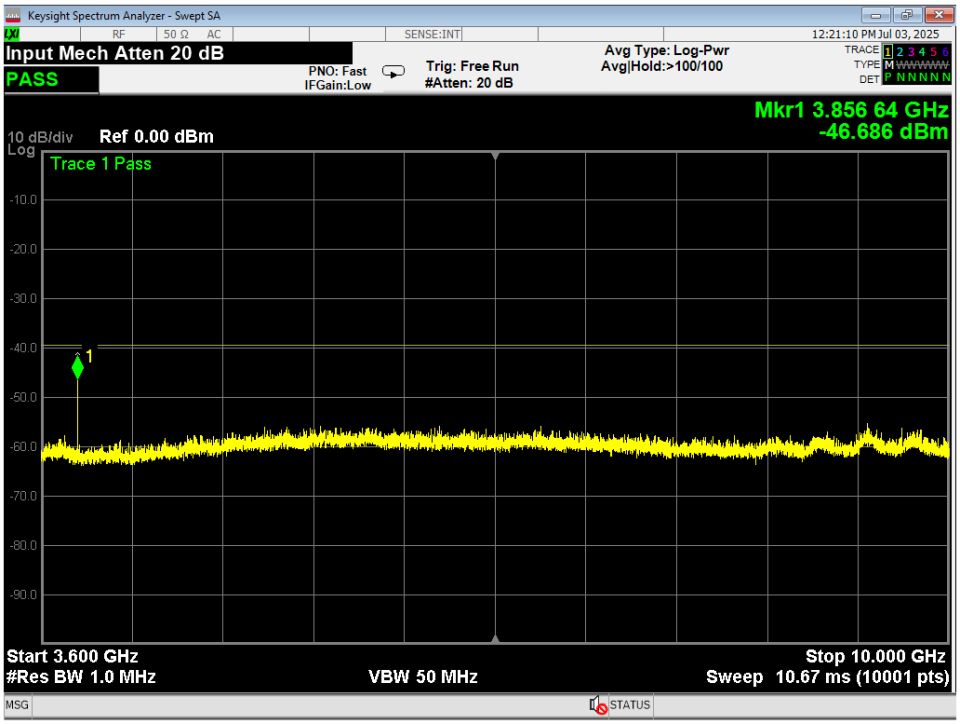

Figure 21 – Out-of-Band Spurious Emissions, 3.6GHz – 10GHz, Low Channel, Ant 1

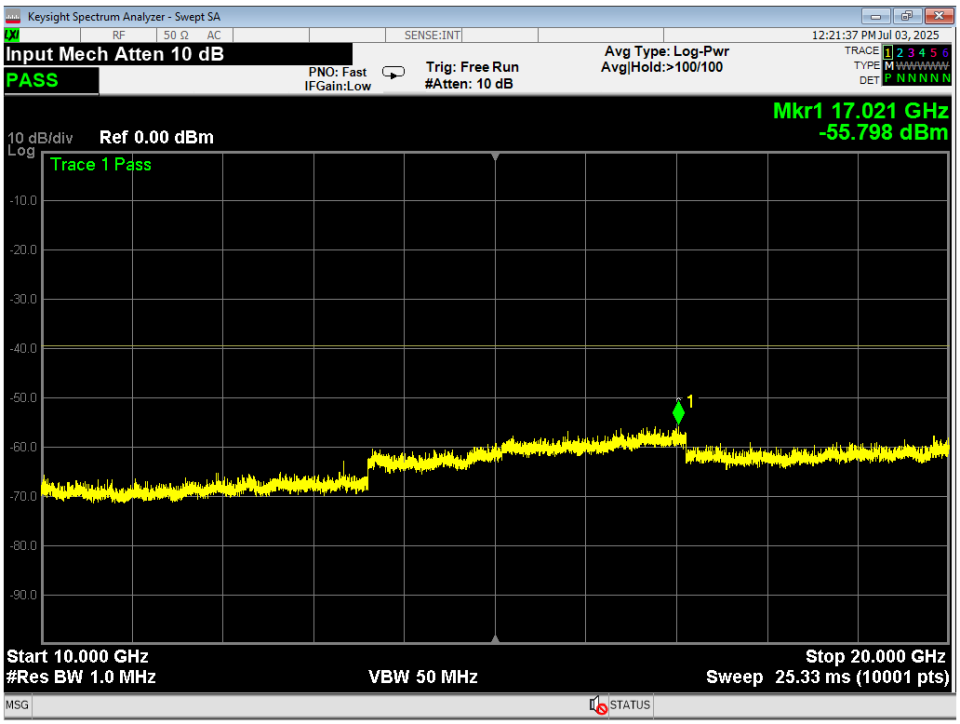

Figure 22 – Out-of-Band Spurious Emissions, 10GHz – 20GHz, Low Channel, Ant 1

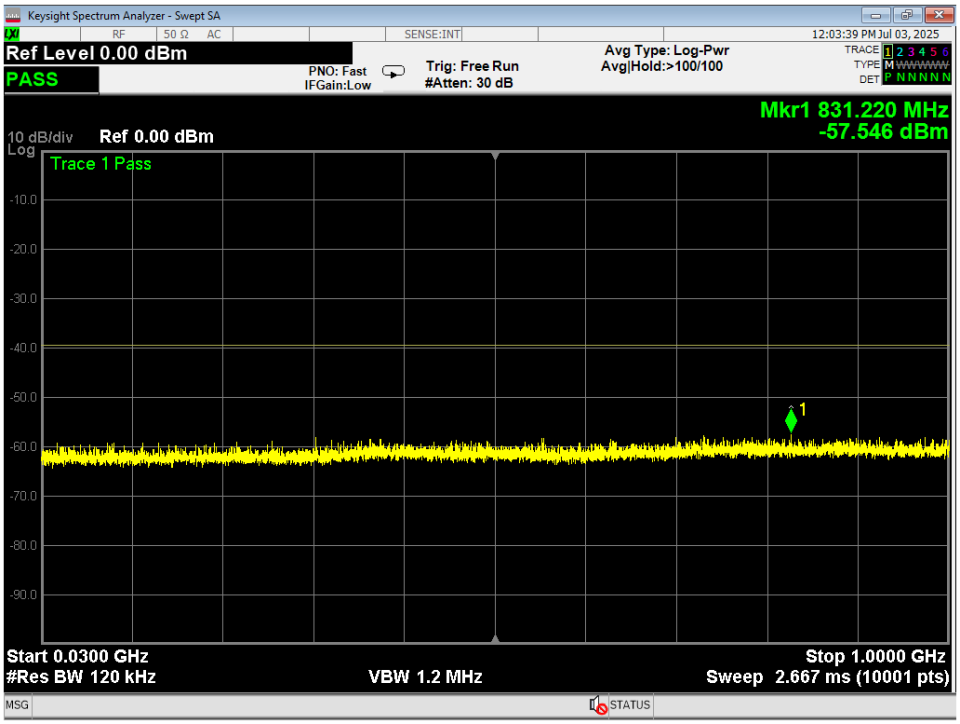

Figure 23 – Out-of-Band Spurious Emissions, 30MHz – 1GHz, High Channel, Ant 1

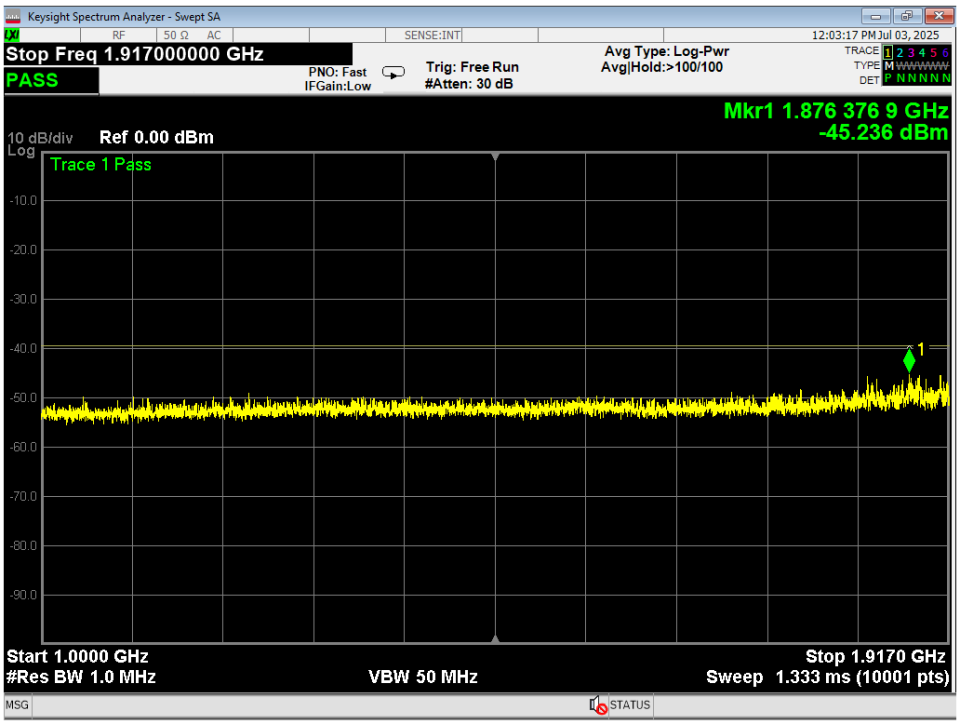

Figure 24 – Out-of-Band Spurious Emissions, 1GHz – 1.917GHz, High Channel, Ant 1

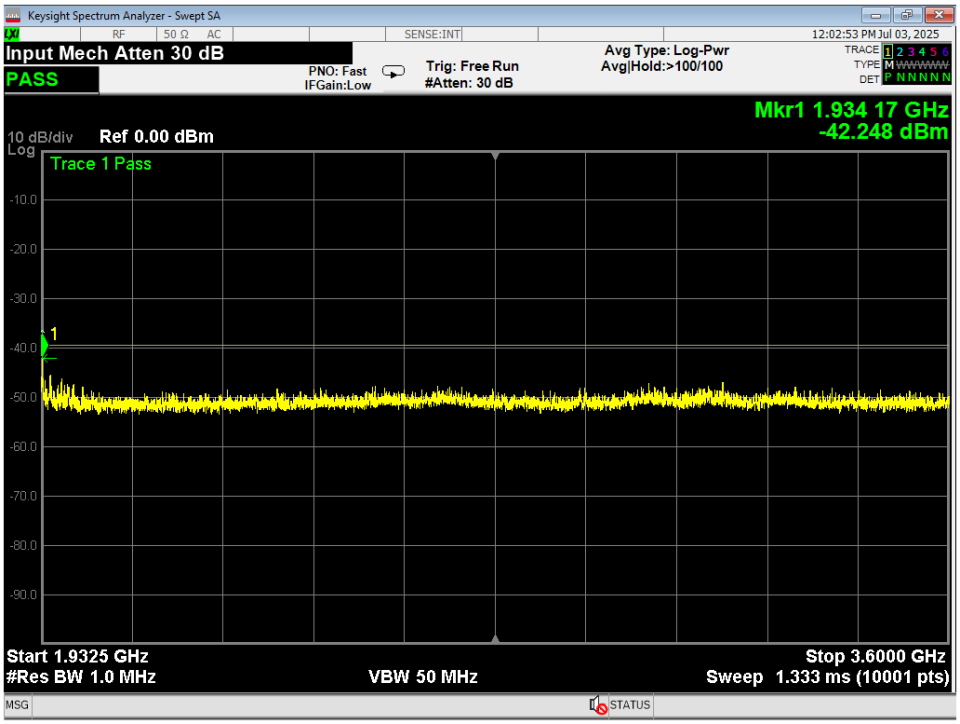

Figure 25 – Out-of-Band Spurious Emissions, 1.9325GHz – 3.6GHz, High Channel, Ant 1

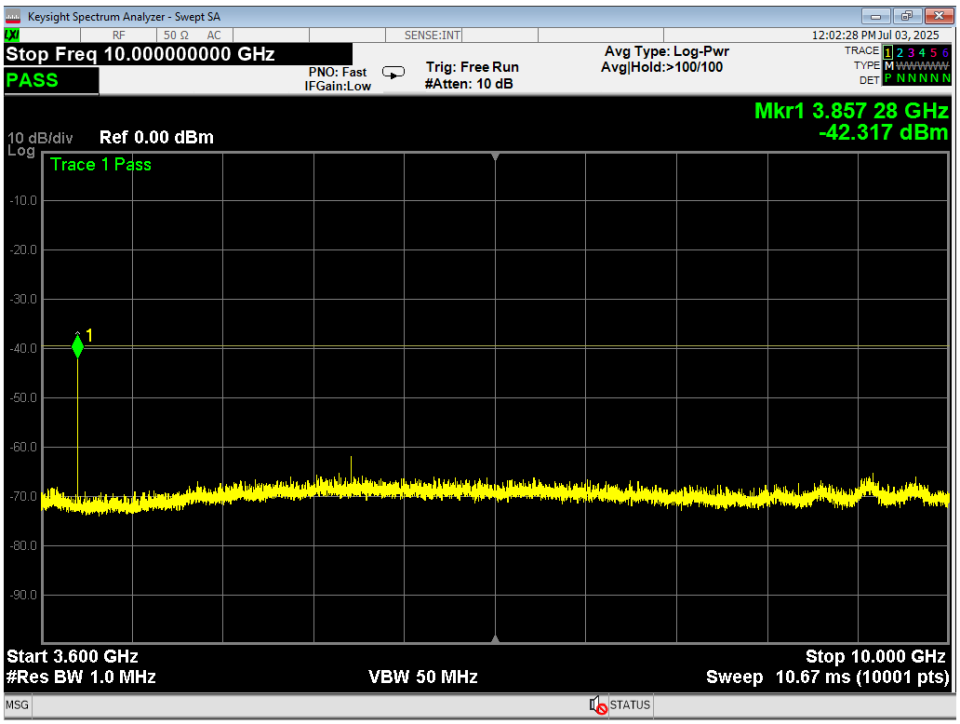

Figure 26 – Out-of-Band Spurious Emissions, 3.6GHz – 10GHz, High Channel, Ant 1

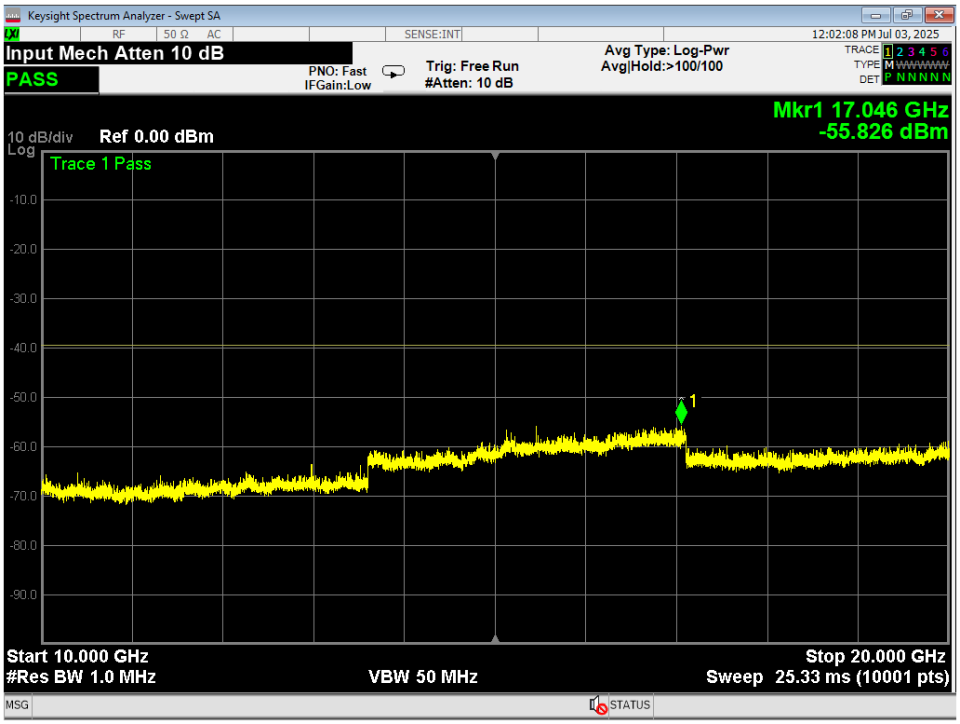

Figure 27 – Out-of-Band Spurious Emissions, 10GHz – 20GHz, High Channel, Ant 1

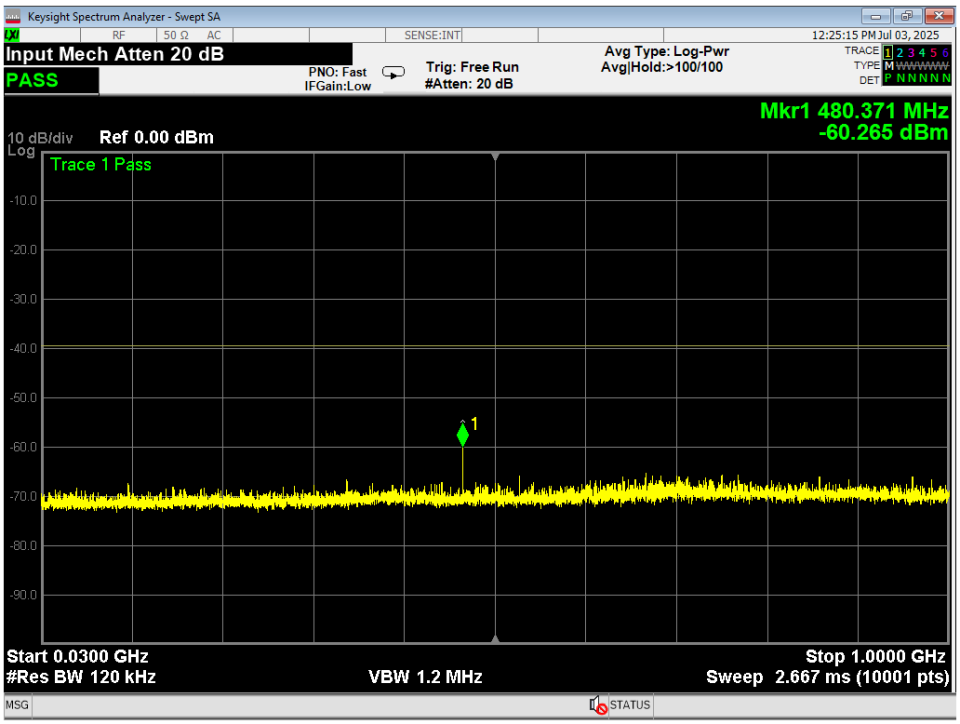

Figure 28 – Out-of-Band Spurious Emissions, 30MHz – 1GHz, Low Channel, Ant 2

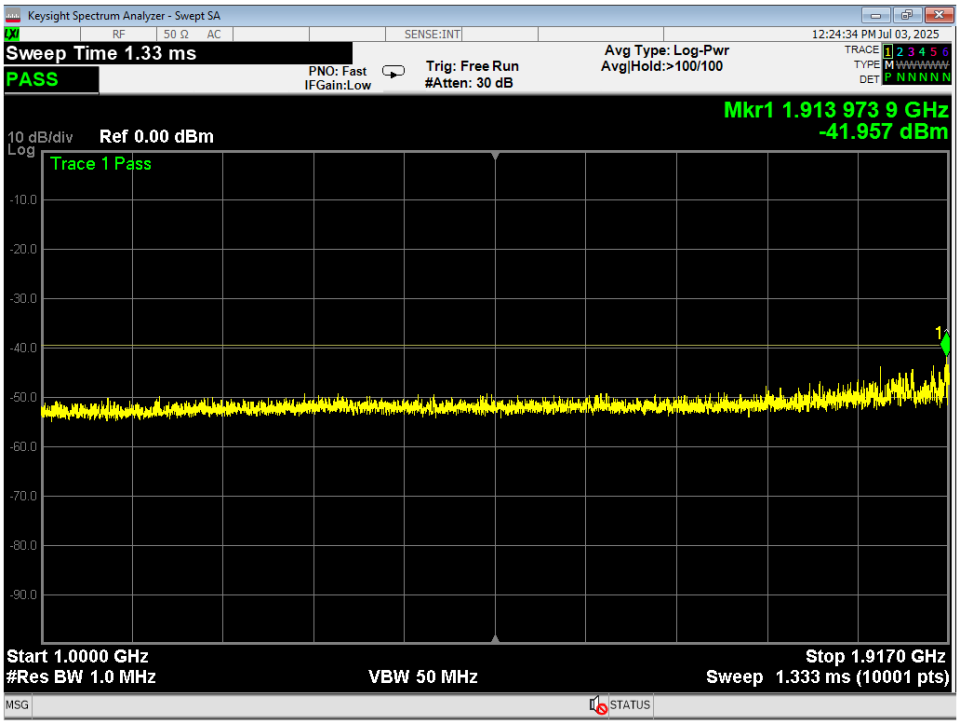

Figure 29 – Out-of-Band Spurious Emissions, 1GHz – 1.917GHz, Low Channel, Ant 2

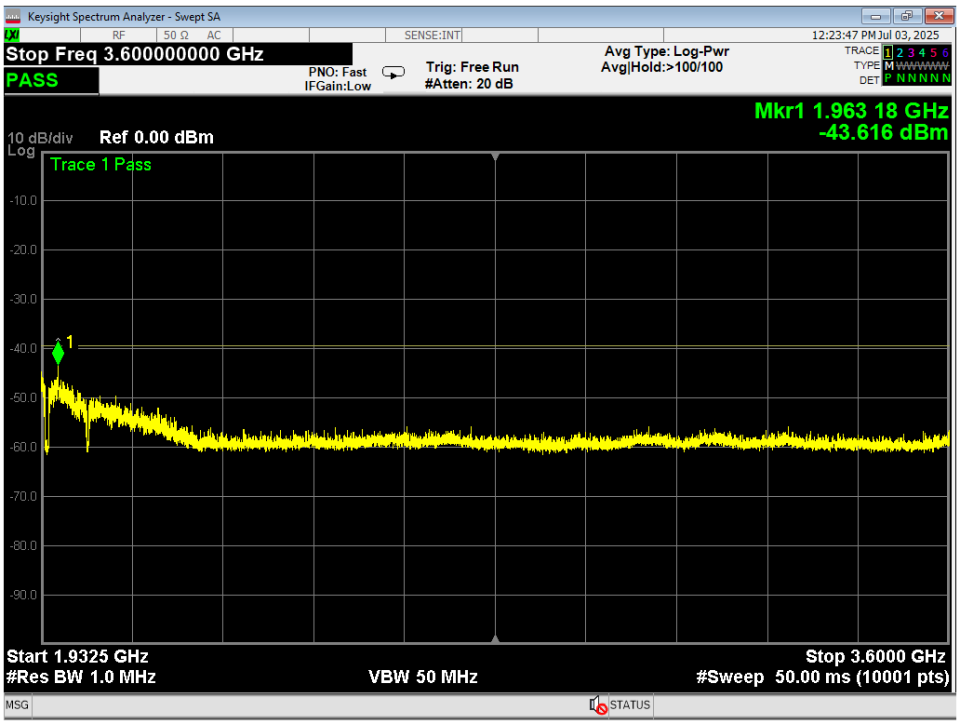

Figure 30 – Out-of-Band Spurious Emissions, 1.9325GHz – 3.6GHz, Low Channel, Ant 2

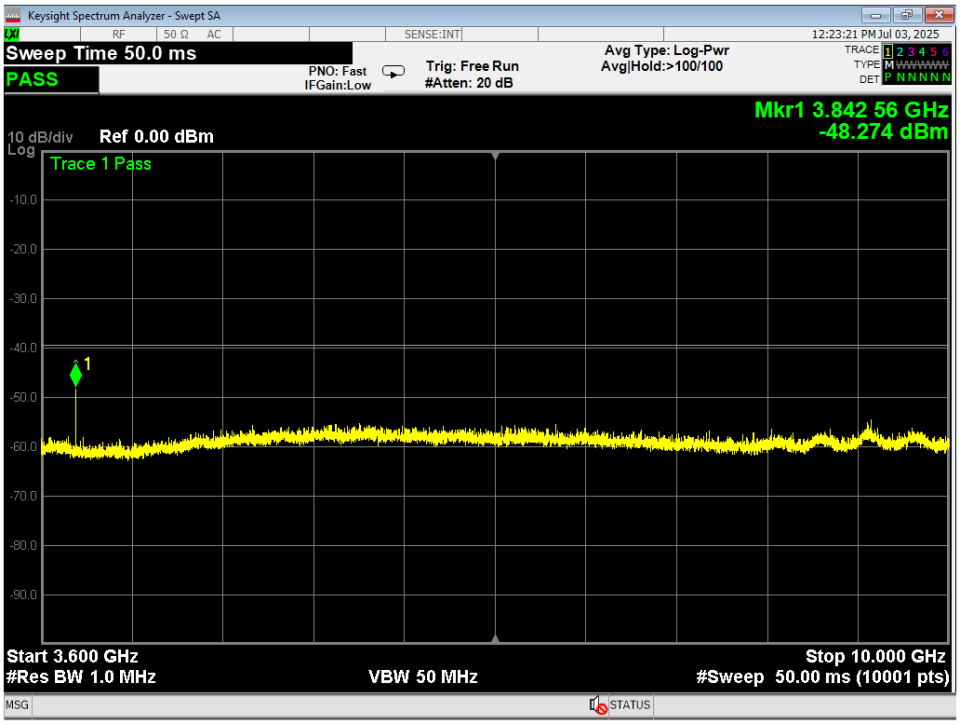

Figure 31 – Out-of-Band Spurious Emissions, 3.6GHz – 10GHz, Low Channel, Ant 2

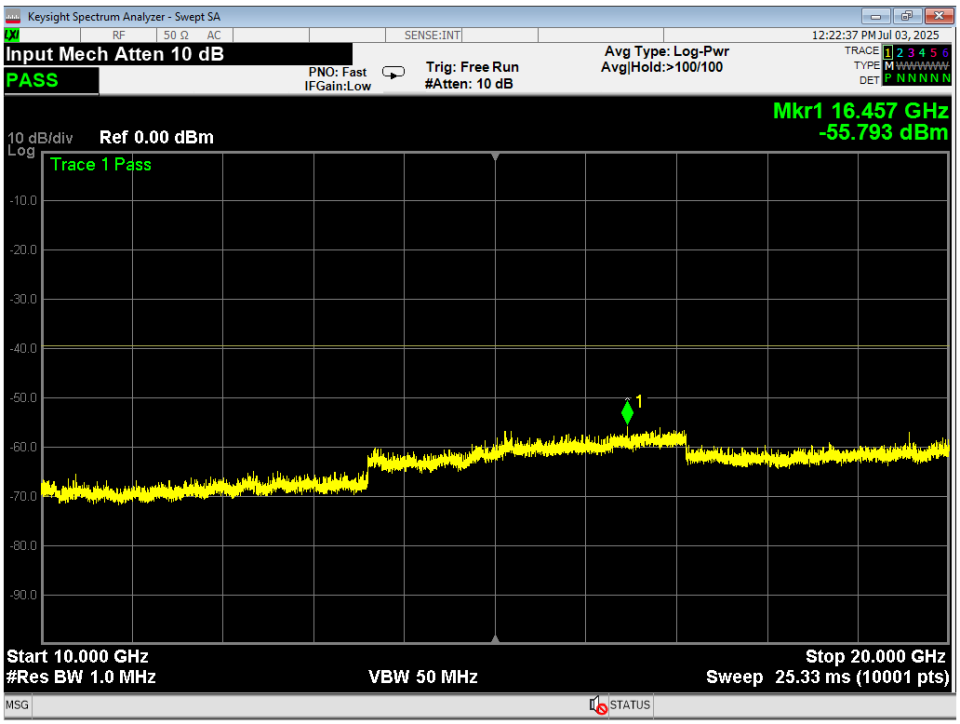

Figure 32 – Out-of-Band Spurious Emissions, 10GHz – 20GHz, Low Channel, Ant 2

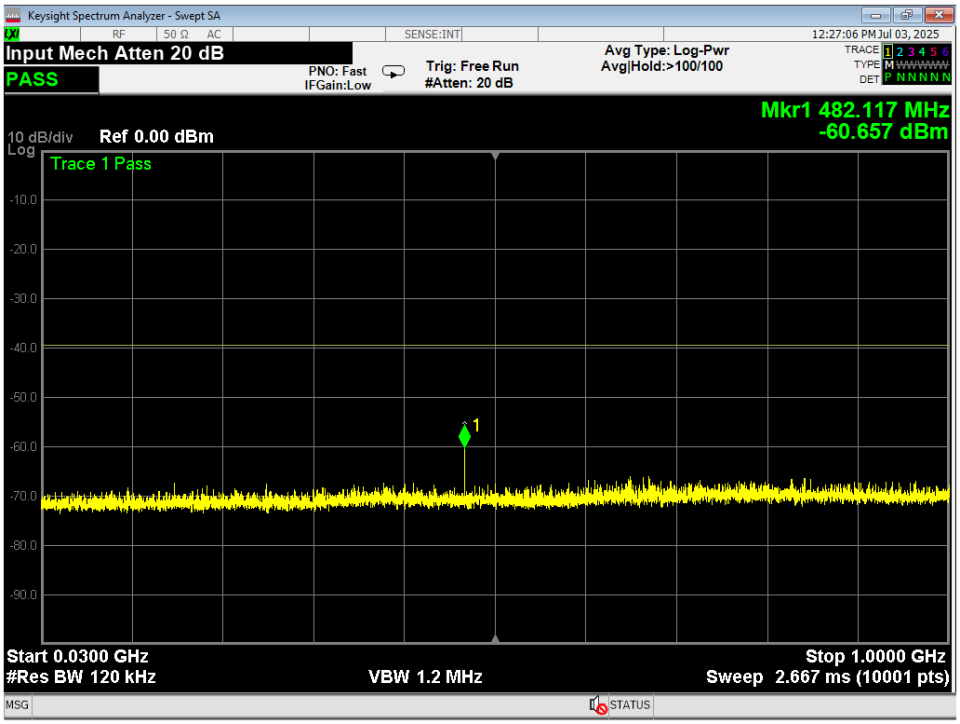

Figure 33 – Out-of-Band Spurious Emissions, 30MHz – 1GHz, High Channel, Ant 2

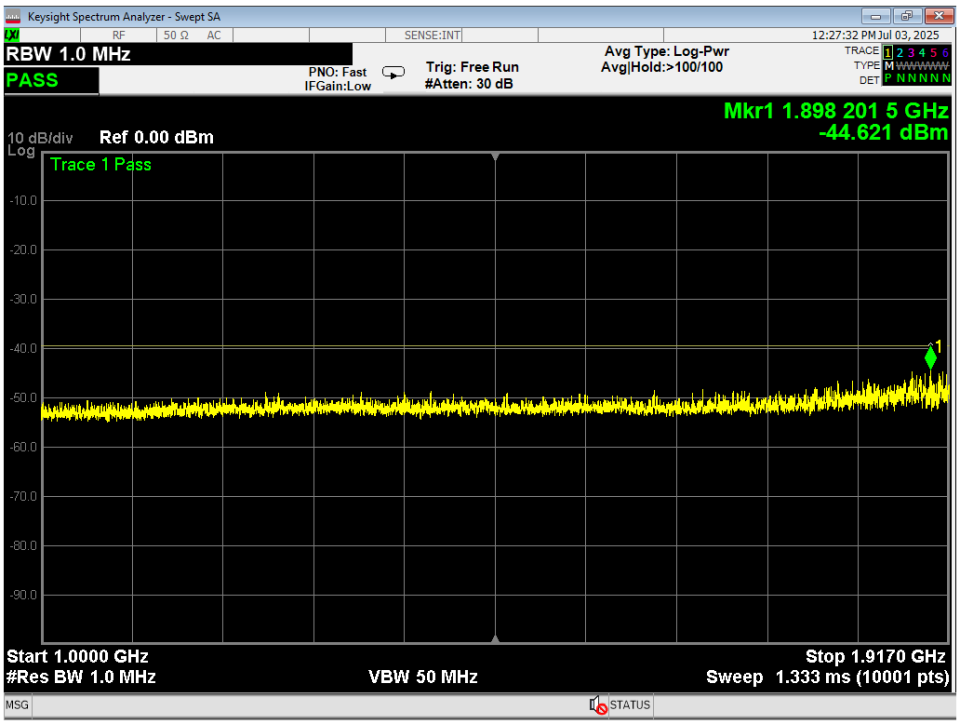

Figure 34 – Out-of-Band Spurious Emissions, 1GHz – 1.917GHz, High Channel, Ant 2

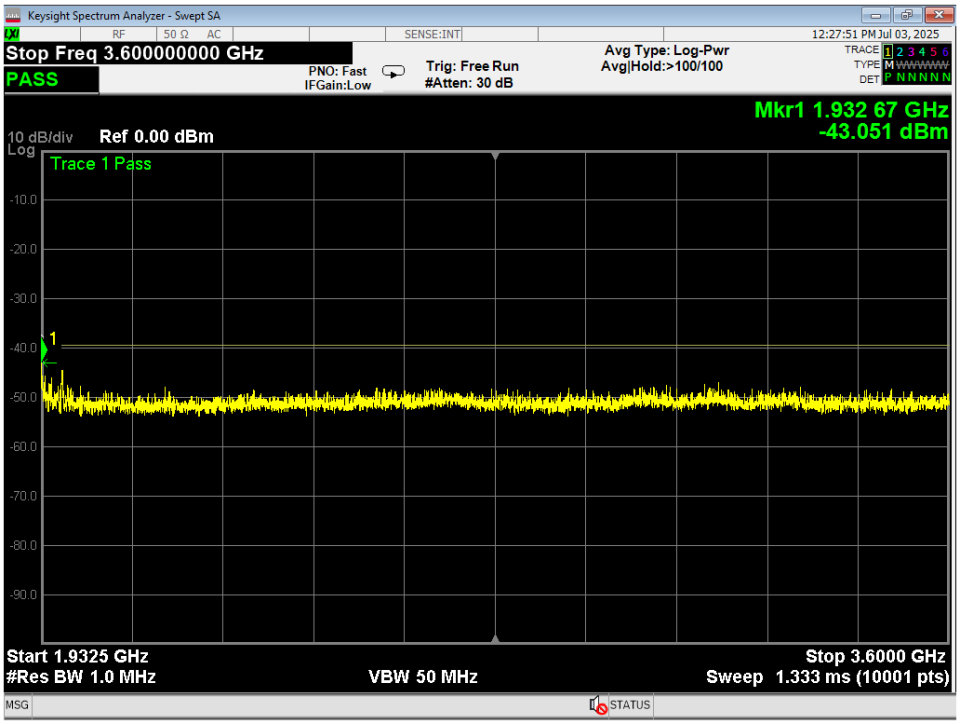

Figure 35 – Out-of-Band Spurious Emissions, 1.9325GHz – 3.6GHz, High Channel, Ant 2

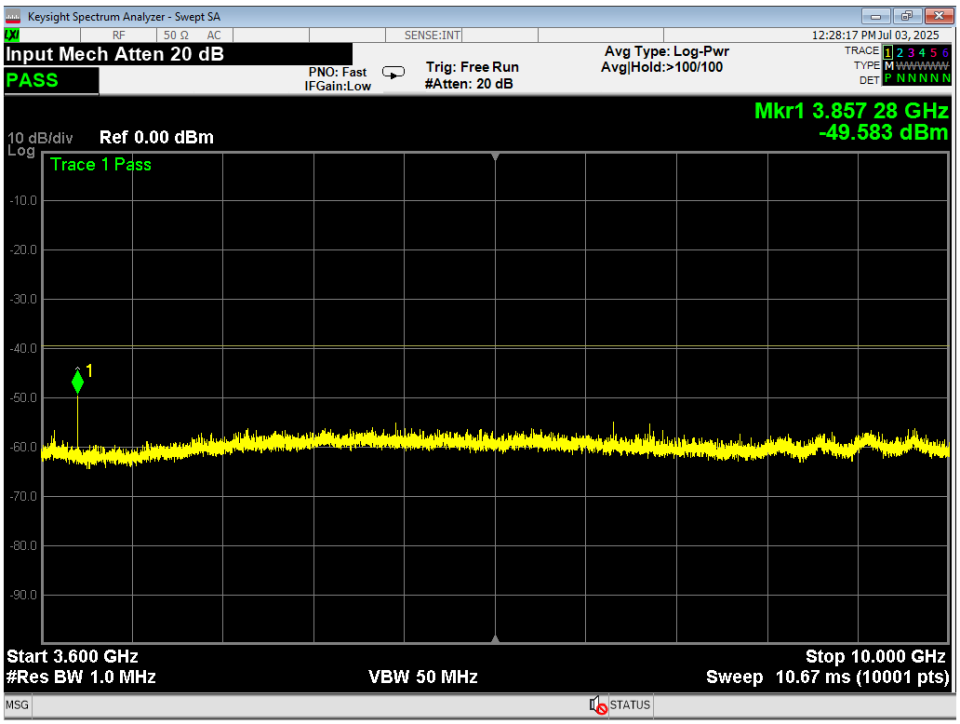

Figure 36 – Out-of-Band Spurious Emissions, 3.6GHz – 10GHz, High Channel, Ant 2

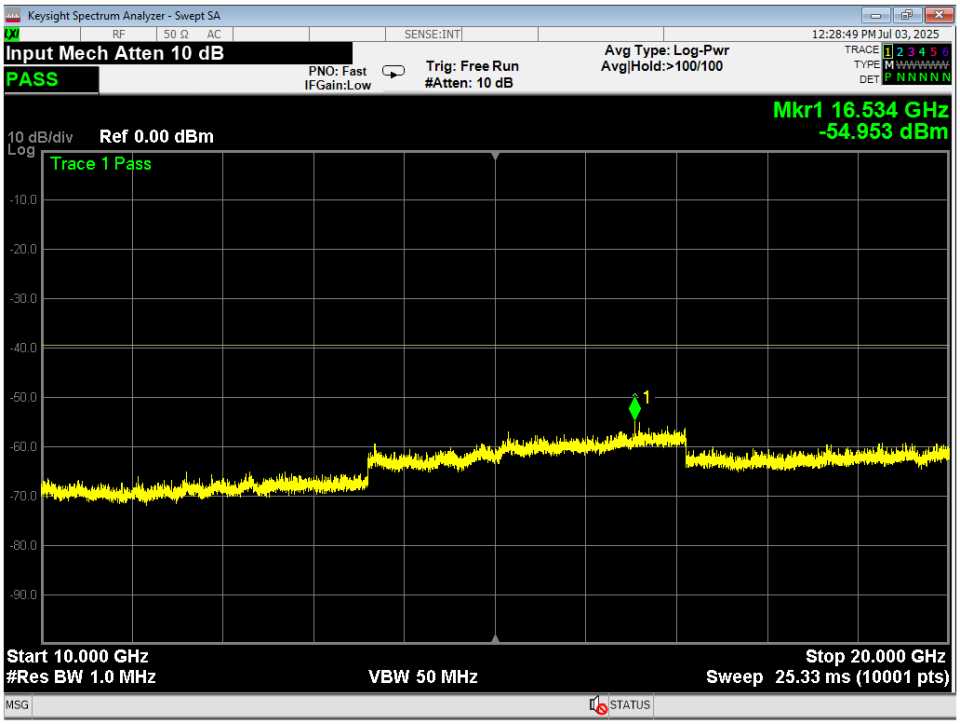

Figure 37 – Out-of-Band Spurious Emissions, 10GHz – 20GHz, High Channel, Ant 2

4.9 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	-75.123	-57	-57
>1000	1	-67.468	-53	-53
30 - 1000	2	-76.146	-57	-57
>1000	2	-67.739	-53	-53

4.10 FREQUENCY STABILITY

Test Method: ANSI C63.17 Sec. 6.2.1

Limits for Frequency Stability
10ppm
For 1921.536MHz; Limit = 19215.36Hz / 19.21536kHz
For 1928.448MHz; Limit = 19284.48Hz / 19.28448kHz

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

TR2800			
DECT Antenna 1			
	Voltage	Frequency Error (kHz)	
Temperature (°C)	(VDC)	Ch 1	Ch 2
		1921.536 MHz	1928.448 MHz
-20°C	USB C	-1.966	-8.756
+20°C	USB C	-4.612	-14.000
+50°C	USB C	-3.727	-10.115
TR2800			
DECT Antenna 2			
	Voltage	Frequency Error (kHz)	
Temperature (°C)	(VDC)	Ch 1	Ch 2
		1921.536 MHz	1928.448 MHz
-20°C	USB C	9.190	0.925
+20°C	USB C	-13.214	10.268
+50°C	USB C	19.030	-13.208

DECT Stability over time		
DECT Antenna 1 (Low Channel)		
Temp (°C)	Time	Frequency Error (kHz)
20°C	Start	-8.688
20°C	15 min	-6.015
20°C	30 min	-7.811
20°C	45 min	-11.251
20°C	60 min	-12.285

4.11 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

4.12 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*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*Log(B) – 10 (dBm)
P_{EUT} = Transmitted Power (dBm)

Monitor Threshold	B (Hz)	M_L	P_{MAX} (dBm)	P_{EUT} (dBm)	T_L
Lower Threshold	1.203*10^6	30	20.38	19.394	-82.211

Test results:

Interferer Description / Limits	Reaction of EUT	Results
Apply interference to the EUT on f_1 at a level of $T_L + U_M + 7$ dB and on f_2 at a level of $T_L + U_M$. Initiate transmission. The EUT should transmit on f2. Terminate the connection. Repeat five times.If the EUT transmits once or more on any of the system carriers other than f2, the test failed.	EUT Tx on f2	PASS
Apply interference to the EUT on f_1 at a level of $T_L + U_M$ and on f_2 at a level of $T_L + U_M + 7$ dB. Initiate transmission. The EUT should transmit on f1. Terminate the connection. Repeat five times.If the EUT transmits once or more on any of the system carriers other than f1, the test failed	EUT Tx on f1	PASS
Apply interference to the EUT on f_1 at a level of $T_L + U_M + 1$ dB and on f_2 at a level of TL + UM - 6 dB. Initiate transmission. If the EUT transmits on f2, terminate the connection. Repeat five times. If the EUT transmits once or more on any of the system carriers other than f2, the test failed	EUT Tx on f2	PASS
Apply interference to the EUT on f_1 at a level of $T_L + U_M - 6$ dB and on f_2 at a level of TL + UM + 1 dB. Initiate transmission. If the EUT transmits on f1, terminate the connection. Repeat five times. If the EUT transmits once or more on any of the system carriers other than f1, the test	EUT Tx on f1	PASS

4.13 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:

a) 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.

b) 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

c) 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 µs and 50*√(1.25/B) µs, where *B* is the emission bandwidth of the EUT in megahertz.

d) 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 µs and 35*√(1.25/B) µs, where *B* is the emission bandwidth of the EUT in megahertz.

Test results:

Test Pulse Width (µs)	Reaction from EUT	Result
$50*\sqrt{1.25/B}$	Transmission only f2	PASS
$35*\sqrt{1.25/B}$	Transmission only f2	PASS

4.14 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.

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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

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 dBμV 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 dBμV/m.

FS = 55 + 12 – (-1.1 + 20) + 0 = 48.1 dBμV/m

The 48.1 dBμV/m value can be mathematically converted to its corresponding level in μV/m.

Level in μV/m = Common Antilogarithm [(48.1 dBμV/m)/20]= 254.1 μV/m

AV is calculated by taking the 20*log(T_{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 (Watts) = [Field Strength (V/m) x antenna distance (m)]^2 / 30
Power (watts) = 10^[Power (dBm)/10] / 1000
Voltage (dBμV) = Power (dBm) + 107 (for 50Ω measurement systems)
Field Strength (V/m) = 10^[Field Strength (dBμV/m) / 20] / 10^6
Gain = 1 (numeric gain for isotropic radiator)
Conversion from 3m field strength to EIRP (d=3):
EIRP = [FS(V/m) x d^2]/30 = FS [0.3] for d = 3
EIRP(dBm) = FS(dBμV/m) – 10(log 10^9)+ 10log[0.3] = FS(dBμV/m) - 95.23
10log(10^9) is the conversion from micro to milli

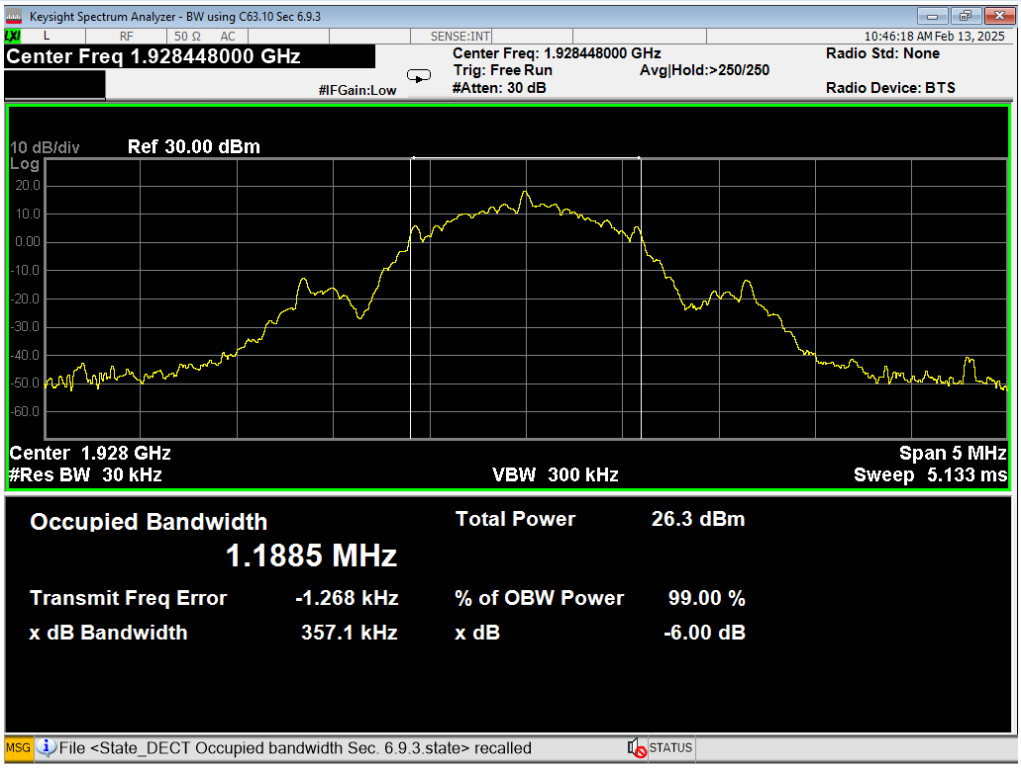
APPENDIX B – MEASUREMENT UNCERTAINTY

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:

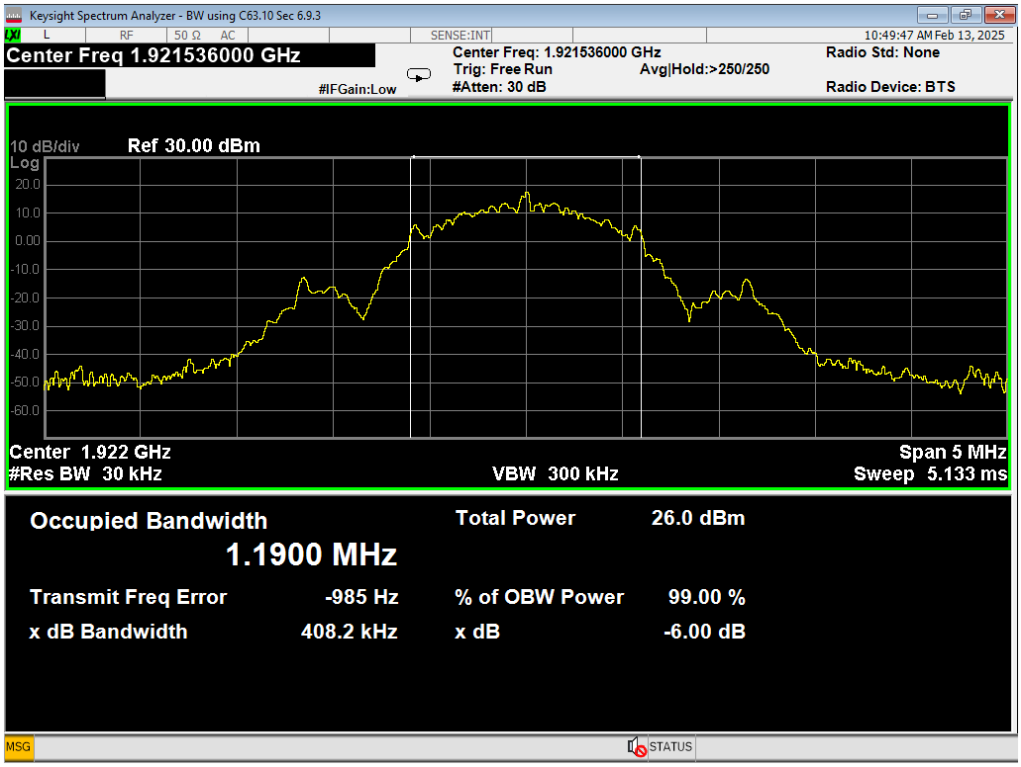
Test	Frequency Range	Uncertainty Value (dB)
Radiated Emissions, 3m	30MHz - 1GHz	±4.31
Radiated Emissions, 3m	1GHz - 18GHz	±5.08
Emissions limits, conducted	30MHz – 18GHz	±3.03

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

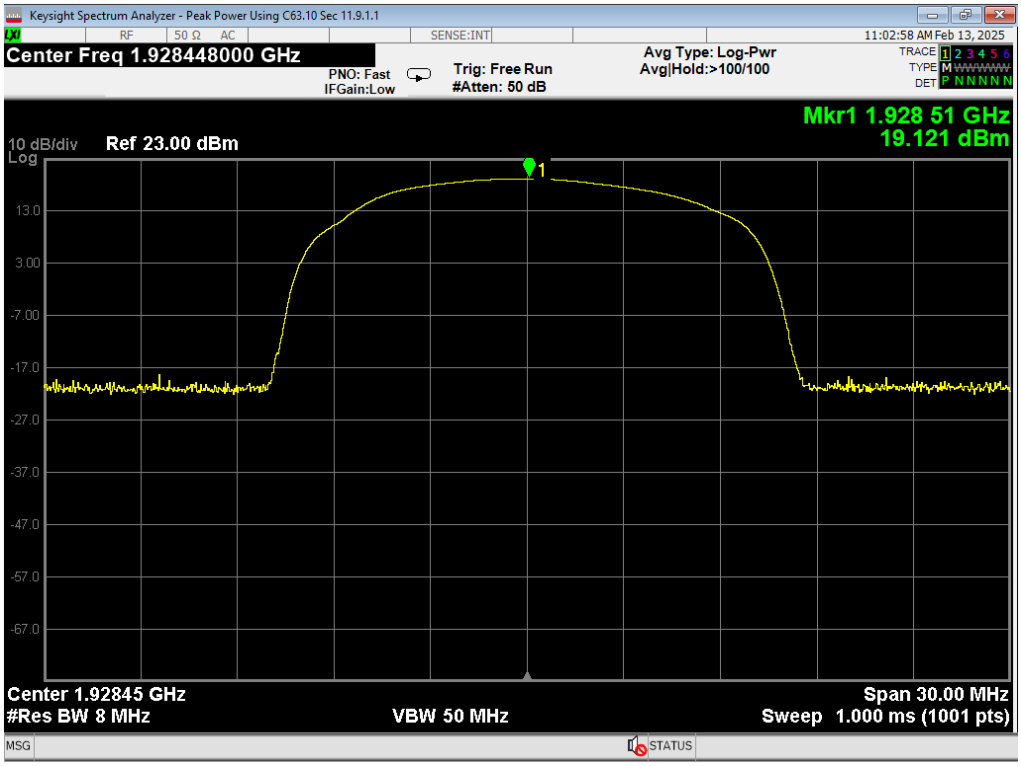
APPENDIX C – GRAPHS AND TABLES



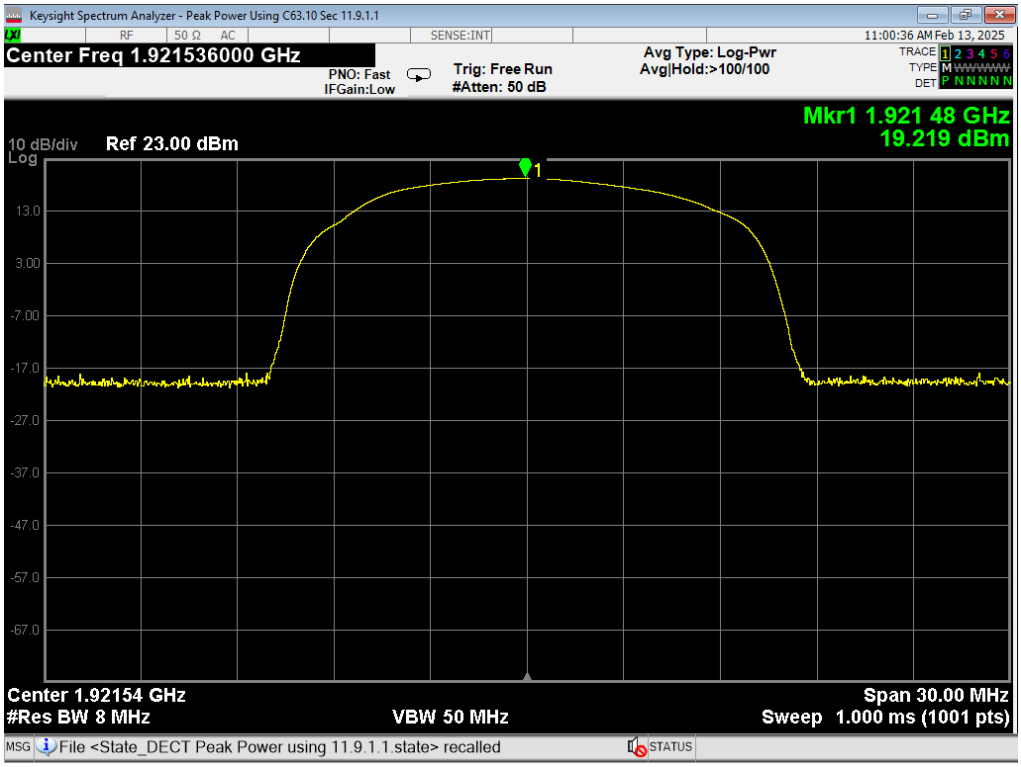
01 OBW, DECT, Antenna 1, High



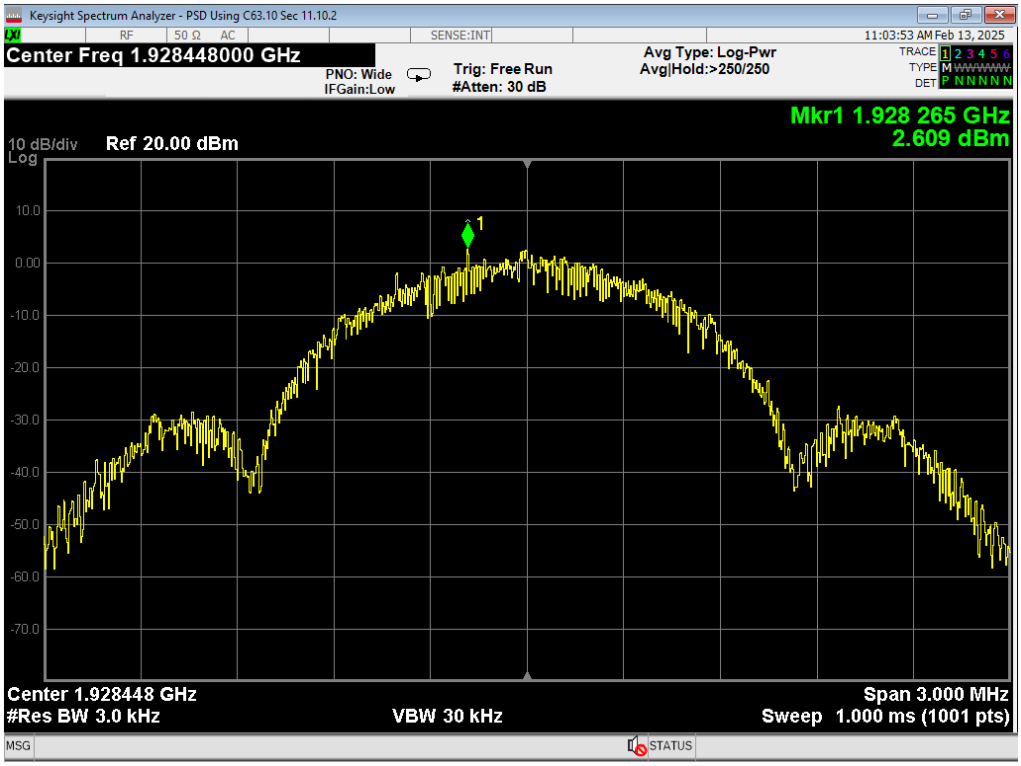
02 OBW, DECT, Antenna 1, Low



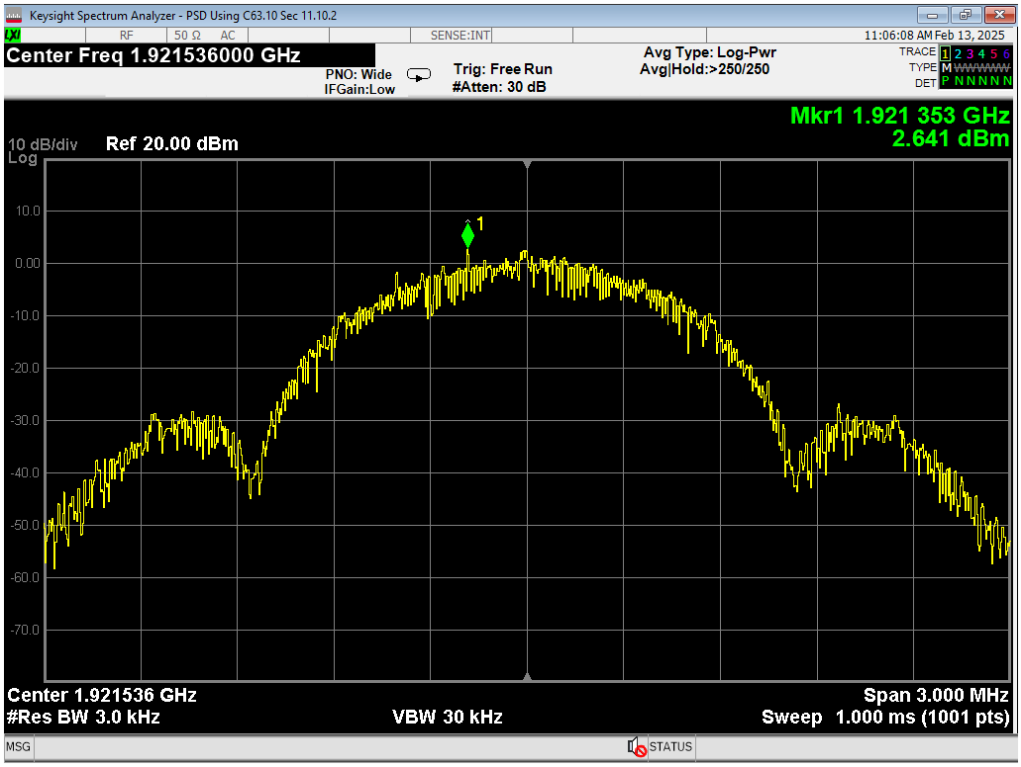
03 Peak Power, DECT, Antenna 1, High



04 Peak Power, DECT, Antenna 1, Low



05 Peak PSD, DECT, Antenna 1, High



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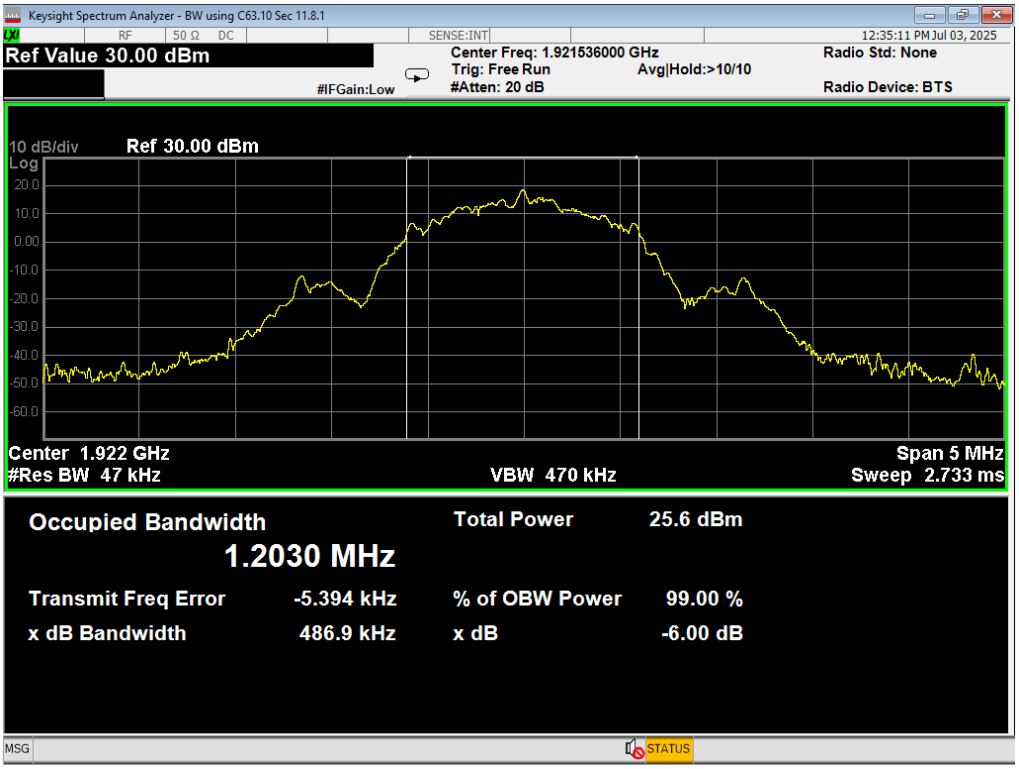
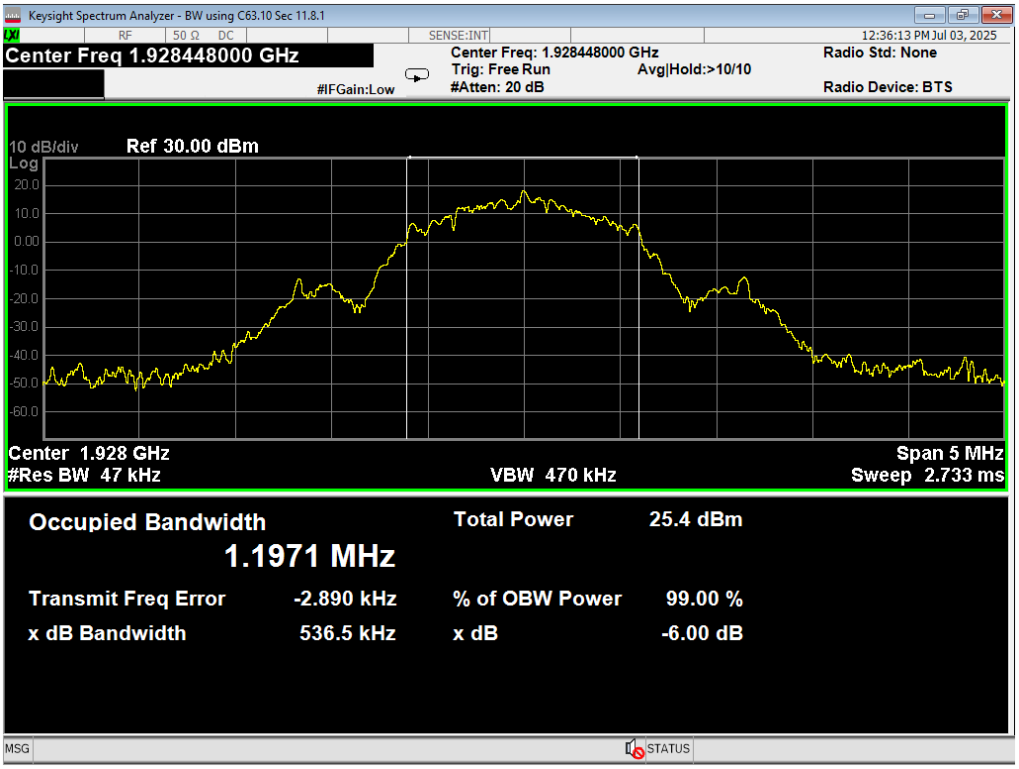
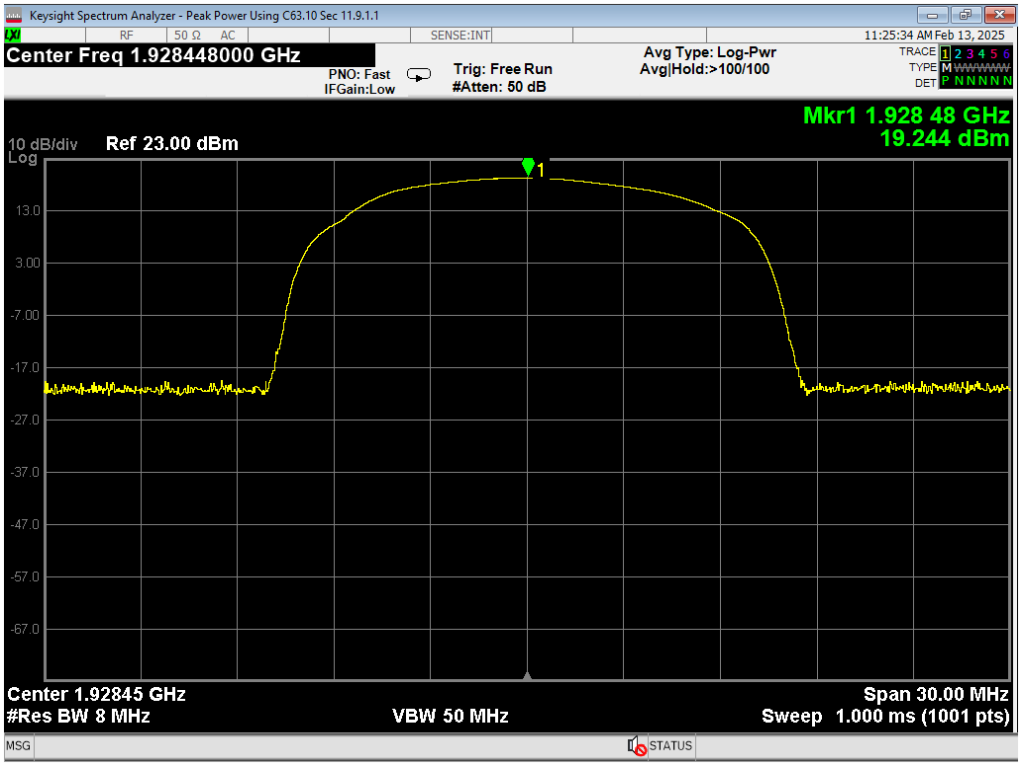


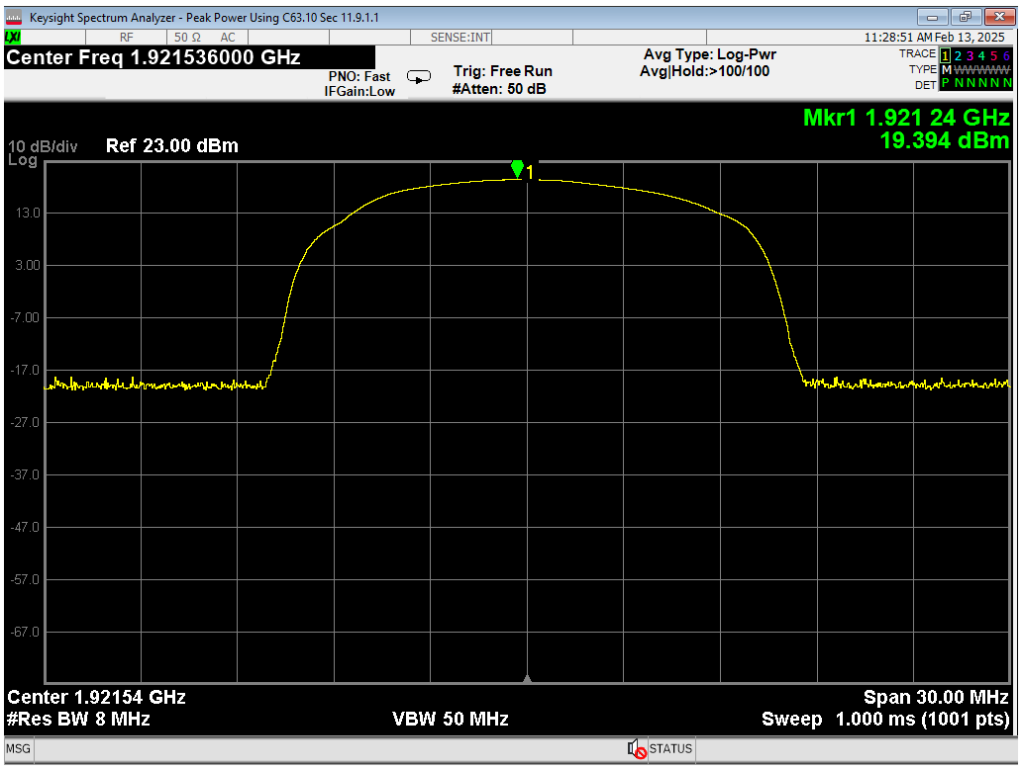
07 OBW, DECT, Antenna 2, High



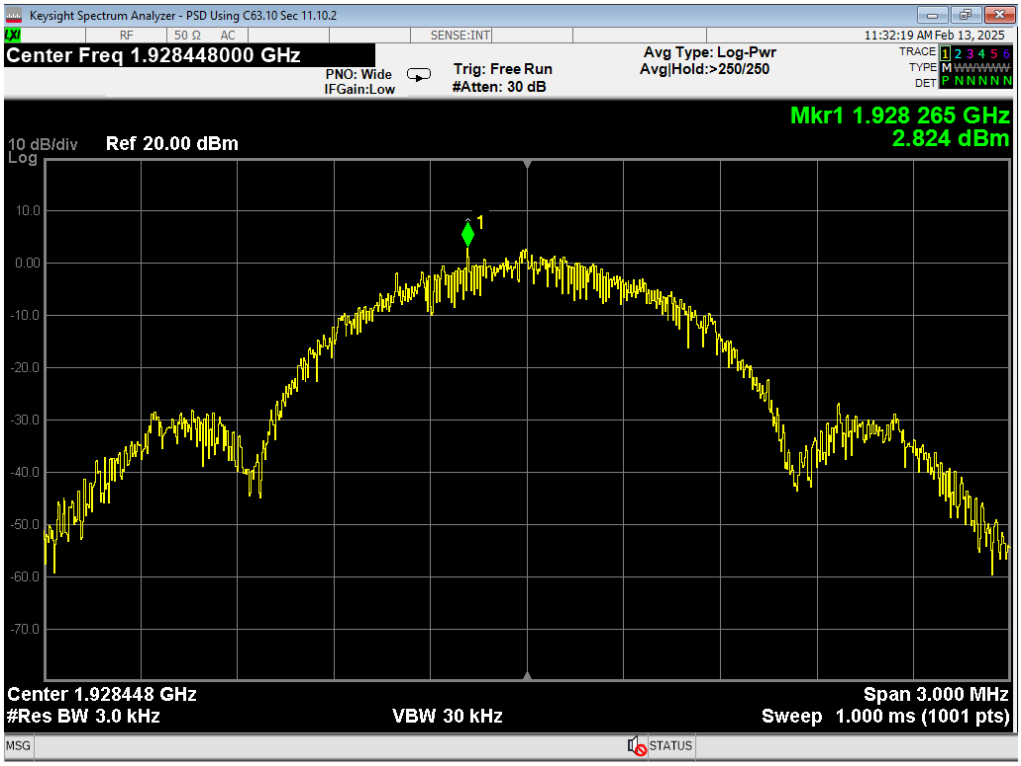
08 OBW, DECT, Antenna 2, Low



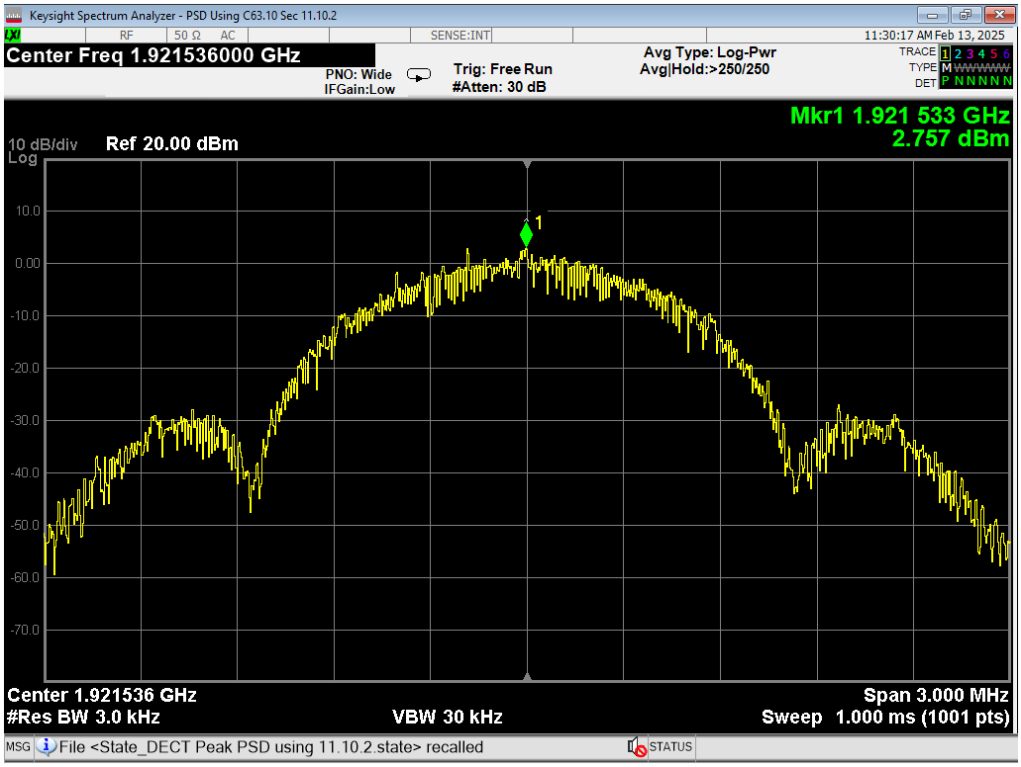
09 Peak Power, DECT, Antenna 2, High



10 Peak Power, DECT, Antenna 2, Low



11 Peak PSD, DECT, Antenna 2, High



12 Peak PSD, DECT, Antenna 2, Low

REPORT END