

Test Report # 3584 E (BT FHSS)

Equipment Under Test: A700x Series Devices (A710x, A720x, A730x)

Requirement(s): FCC 15.247, RSS-247

Test Date(s): June 15th-21st, 2022

Prepared for:
Honeywell International Inc.
Attn: Gretchen Bullen
9680 Old Bailes Road
Fort Mill, SC 29707

Report Issued by: Adam Alger, Laboratory Manager

Signature: *Adam Alger*

Date: 9/15/2022

Report Reviewed by: Adam Alger, Laboratory Manager

Signature: *Adam Alger*

Date: 7/6/2022

Report Constructed by: Zach Wilson, EMC Engineer

Signature: *Zach Wilson*

Date: 7/5/2022

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Company: Honeywell International Inc.	Page 1 of 46	Name: A700x Series Devices (A710x, A720x, A730x)
Report: TR3584 E		Model: TAP1010-02, TAP1020-02, TAP1030-02
Quote: NBO-01-2022-004630		Serial: Engineering Sample

CONTENTS

Laird Connectivity Test Services in Review	3
1 Test Report Summary	4
2 Client Information	5
2.1 Equipment Under Test (EUT) Information	5
2.2 Product Description	5
2.3 Modifications Incorporated for Compliance	5
2.4 Deviations and Exclusions from Test Specifications	6
2.5 Channels and Data Rates	6
2.6 Radio Programming	6
2.7 Antenna	6
2.8 Simultaneous Transmission	6
3 References	7
4 Uncertainty Summary	8
5 Test Data	9
5.1 Antenna Port Conducted Emissions	9
5.1.1 Bandwidth	10
5.1.2 Output Power	17
5.1.3 Conducted Spurious Emissions	21
5.1.4 Frequency Stability	28
5.1.5 FHSS	29
5.2 Radiated Emissions	33
5.2.1 Radiated Emissions	34
6 Revision History	46

Laird Connectivity Test Services in Review

The Laird Connectivity, Inc. laboratory located at W66 N220 Commerce Court Cedarburg, Wisconsin, 53012 USA is recognized through the following organizations:



A2LA – American Association for Laboratory Accreditation

Accreditation based on ISO/IEC 17025:2017 with Electrical (EMC) Scope

A2LA Certificate Number: 1255.01

Scope of accreditation includes all test methods listed herein unless otherwise noted



Federal Communications Commission (FCC) – USA

Accredited Test Firm Registration Number: 953492

Recognition of two 3 meter Semi-Anechoic Chambers



**Government
of Canada**

Innovation, Science and Economic Development Canada

Accredited U.S. Identification Number: US0218

Recognition of two 3 meter Semi-Anechoic Chambers

Company: Honeywell International Inc.	Page 3 of 46	Name: A700x Series Devices (A710x, A720x, A730x)
Report: TR3584 E		Model: TAP1010-02, TAP1020-02, TAP1030-02
Quote: NBO-01-2022-004630		Serial: Engineering Sample

1 TEST REPORT SUMMARY

During **June 15th-21st, 2022** the Equipment Under Test (EUT), **A700x Series Devices (A710x, 720x, 730x)**, as provided by **Honeywell International Inc.** was tested to the following requirements **Federal Communications Commission and Innovation, Science and Economic Development Canada**:

FCC 15.247 / RSS-247, FHSS

Requirement	Description	Specification	Method	Result
FCC: 15.247 (a)(1) IC: RSS-247 5.1	Channel Separation, Number of Hopping frequencies, Time of Occupancy	FHSS	ANSI C63.10	Compliant
FCC: 2.1049 IC: RSS-GEN 6.6	Occupied Bandwidth	Reported	ANSI C63.10	Compliant
FCC: 15.247 (b)(1) IC: RSS-247 5.4 (b)	Maximum Conducted Output Power	30 dBm	ANSI C63.10	Compliant
FCC: 15.247 (d) IC: RSS-247 5.5	RF Spurious Emissions at the Transmitter Antenna Terminal	20 dBc	ANSI C63.10	Compliant
FCC: 15.247 (d) IC: RSS-GEN 8.10	Spurious Radiated Emissions in Restricted Bands	FCC 15.209 RSS-GEN 8.9	ANSI C63.10	Compliant

Notice:

The results relate only to the item tested as configured and described in this report. Any additional configurations, modes of operation, or modifications made to the equipment under test after the specified test date(s) are at the decision of the client and may not apply to the data seen in this test report.

The decision rule for Pass / Fail assessment to the specification or standard listed in this test report has been agreed upon by the client and laboratory to be as follows:

Measurement Type	Rule
Emissions – Amplitude	1 dB below specified limit
Emissions – Frequency	1% less than the specification
Immunity	Tested at specified level

2 CLIENT INFORMATION

Company Name	Honeywell International Inc.
Contact Person	Gretchen Bullen
Address	9680 Old Bailes Road Fort Mill, SC 29707

2.1 Equipment Under Test (EUT) Information

The following information has been supplied by the client

Product Name	A700x Series Devices (A710x, 720x, 730x)
Model Number	TAP1010-02, TAP1020-02, TAP1030-02
Serial Number	Engineering Sample
FCC ID	HD5-TAP1000-02
IC ID	1693B-TAP100002

2.2 Product Description

The EUT is a handheld communication device consisting of the Laird SU60-SIPT WLAN 2.4/5 GHz and BLE/BT module. The EUT also contains the NXP PN7150BOHN/C110xx NFC radio. The EUT was powered by a 3.7 VDC battery. The WLAN operates in SISO mode only.

The EUT has three different models:

- A710x - Contains the basic wireless functionality
- A720x - Contains an end cap with two external proprietary connectors that add on the ability to connect a wired headset and a peripheral device such as a printer or scanner.
- A730x - Contains an imager end cap that adds scanning functionality.

All models use identical radios and circuit boards in the “base unit” and the different A700x versions add additional (non-radio) capabilities through different, factory configurable “end caps”.

All conducted testing was completed on the A710x model. Radiated measurements completed for all three models.

2.3 Modifications Incorporated for Compliance

None noted at time of test

Company: Honeywell International Inc.	Page 5 of 46	Name: A700x Series Devices (A710x, A720x, A730x)
Report: TR3584 E		Model: TAP1010-02, TAP1020-02, TAP1030-02
Quote: NBO-01-2022-004630		Serial: Engineering Sample

2.4 Deviations and Exclusions from Test Specifications

None noted at time of test

2.5 Channels and Data Rates

DH5 = Basic Rate, 2-DH5 = EDR 2, 3-DH5 = EDR3

Channel	Freq. MHz
0	2402
38	2440
78	2480

2.6 Radio Programming

The WLAN radios were programmed using the Laird Regulatory Tool v 9.32.0.6. BLE and BT radios were programmed using default HCI commands via the windows command prompt. The NFC radio was programmed using Honeywell's CBOB program V1.0.

2.7 Antenna

The device contains three antennas:

- Custom dual band PCB inverted F type antenna with a peak gain of
 - +4.7 dBi in 2400-2484 MHz
 - +6.4 dBi in 5150-5350 MHz
 - +6.9 dBi in 5470-5725 MHz
 - +7.3 dBi in 5725-5850 MHz
- Custom PCB inverted F type antenna with a peak gain of +0.2 dBi for the BT/BLE radios.
- Flex circuit magnetic loop antenna, P/N 1002403 for the NFC radio.

2.8 Simultaneous Transmission

The EUT radio combinations that are capable of simultaneous transmission are shown below:

- WLAN 5 GHz + BT/BLE + NFC
- WLAN 2.4 GHz + NFC

3 REFERENCES

Publication	Edition	Date	AMD 1	AMD 2
FCC eCFR	-	2021	-	-
RSS-247	2	2017	-	-
RSS-Gen	5	2018	2019	2021
ANSI C63.10	-	2013	-	-

4 UNCERTAINTY SUMMARY

Using the guidance of the following publications the calculated measurement uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level, using a coverage factor of $k = 2$.

References	Version / Date
CISPR 16-4-1	Ed. 2 (2009-02)
CISPR 16-4-2	Ed. 2 (2011-06)
CISPR 32	Ed. 1 (2012-01)
ANSI C63.23	2012
A2LA P103	February 4, 2016
A2LA P103c	August 10, 2015
ETSI TR 100-028	V1.3.1 (2001-03)

Measurement Type	Configuration	Uncertainty \pm
Radiated Emissions	Biconical Antenna	5.0 dB
Radiated Emissions	Log Periodic Antenna	5.3 dB
Radiated Emissions	Horn Antenna	4.7 dB
AC Line Conducted Emissions	Artificial Mains Network	3.4 dB
Telecom Conducted Emissions	Asymmetric Artificial Network	4.9 dB
Disturbance Power Emissions	Absorbing Clamp	4.1 dB
Radiated Immunity	3 Volts/meter	2.2 dB
Conducted Immunity	CDN/EM/BCI	2.4/3.5/3.4 dB
EFT Burst/Surge	Peak pulse voltage	164 volts
ESD Immunity	15 kV level	1377 Volts

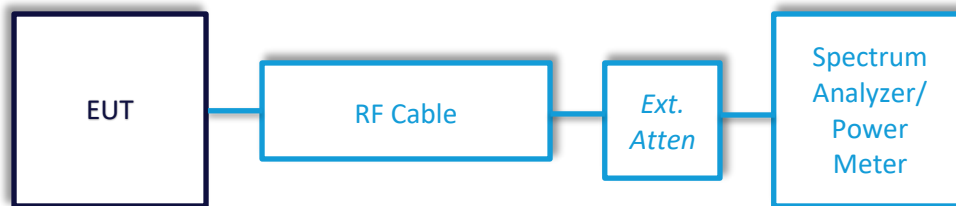
Parameter	ETSI U.C. \pm	U.C. \pm
Radio Frequency, from F0	1×10^{-7}	0.55×10^{-7}
Occupied Channel Bandwidth	5 %	2 %
RF conducted Power (Power Meter)	1.5 dB	1.2 dB
RF conducted emissions (Spectrum Analyzer)	3.0 dB	1.7 dB
All emissions, radiated	6.0 dB	5.3 dB
Temperature	1° C	0.65° C
Humidity	5 %	2.9 %
Supply voltages	3 %	1 %

5 TEST DATA

5.1 Antenna Port Conducted Emissions

Description of Measurement	<p>The direct measurement of emissions at the antenna port of the EUT is achieved by use of a RF connection to a spectrum analyzer or power meter.</p> <p>The cable and attenuator factors are loaded into the analyzer or power meter allowing for direct measurement readings without the need for further corrections.</p>
Example Calculations	<p>Measurement (dBm) + Cable factor (dB) + External Attenuator (dB) = Corrected Reading (dBm)</p> <p>Margin (dB) = Limit (dBm) – Corrected Reading (dBm)</p>

Block Diagram



Instrumentation

Asset #	Description	Manufacturer	Model #	Serial #	Date	Due Date	Status
AA 960173	Cable	A.H. Systems, Inc.	SAC-26G-1	388	3/22/2022	3/22/2023	Active Verification
EE 960087	Analyzer - Spectrum	Agilent	N9010A	MY53400296	4/12/2022	4/12/2023	Active Calibration

5.1.1 Bandwidth

Operator	Anthony Smith	QA	Zach Wilson
Temperature	21.4°C, 22°C, 21.8C	R.H. %	55.6%, 49.9%, 49.3%
Test Date	6/15/2022, 6/16/2022, 6/21/2022	Location	Conducted Radio Bench
Requirement	FCC 2.1049	Method	ANSI C63.10 §6.9

Limits: Reported

Test Parameters

Frequency	2402, 2440, 2480 MHz	Setup	Conducted
RBW	10/20 kHz	VBW	30/62 kHz
Detector(s)	Max peak hold	Sweep Time	Auto

EUT Parameters

Input Power	3.7VDC Battery	Mode	BT
Frequency	2402, 2440, 2480 MHz	Channel	0,38, 78

Data Table

Channel	Data Rate	20dB BW (MHz)
0	DH5	0.925
0	2-DH5	0.924
0	3-DH5	0.924
38	DH5	1.318
38	2-DH5	1.318
38	3-DH5	1.319
78	DH5	1.257
78	2-DH5	1.260
78	3-DH5	1.255

Plots

DH5



20 dB Bandwidth, Channel 0

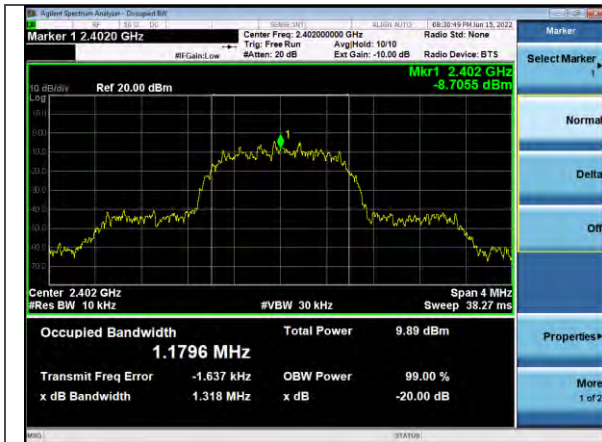


20 dB Bandwidth, Channel 38



20 dB Bandwidth, Channel 78

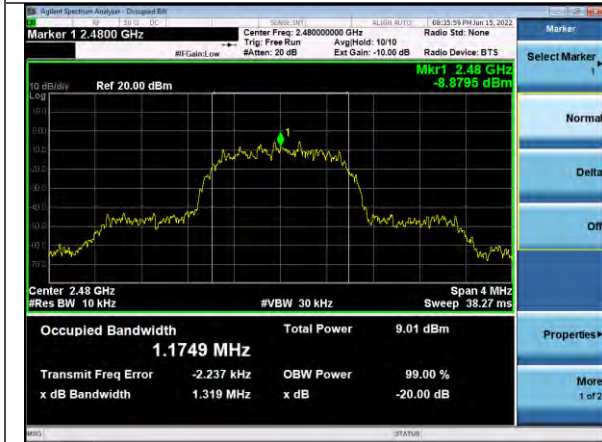
2-DH5



20 dB Bandwidth, Channel 0



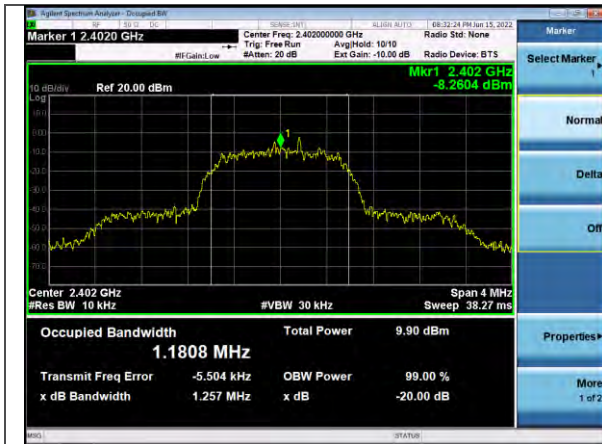
20 dB Bandwidth, Channel 38



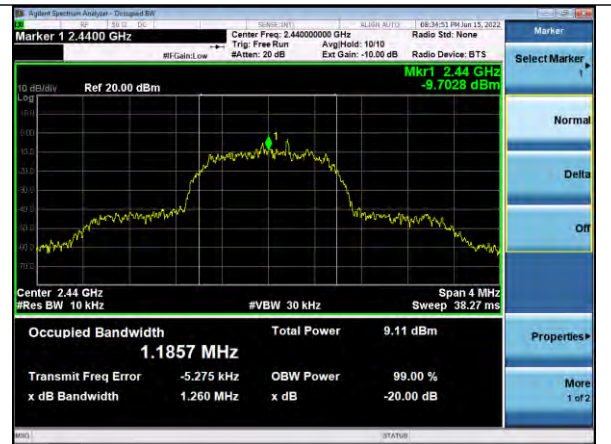
20 dB Bandwidth, Channel 78

Company: Honeywell International Inc.	Page 12 of 46	Name: A700x Series Devices (A710x, A720x, A730x)
Report: TR3584 E		Model: TAP1010-02, TAP1020-02, TAP1030-02
Quote: NBO-01-2022-004630		Serial: Engineering Sample

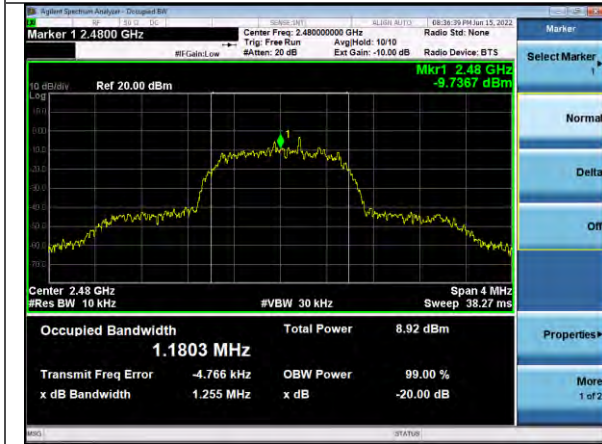
3-DH5



20 dB Bandwidth, Channel 0



20 dB Bandwidth, Channel 38



20 dB Bandwidth, Channel 78

Channel	Data Rate	OBW (MHz)
0	DH5	0.868
0	2-DH5	1.175
0	3-DH5	1.178
38	DH5	0.869
38	2-DH5	1.174
38	3-DH5	1.180
78	DH5	0.867
78	2-DH5	1.175
78	3-DH5	1.176

DH5



99% Occupied Bandwidth, Channel 0



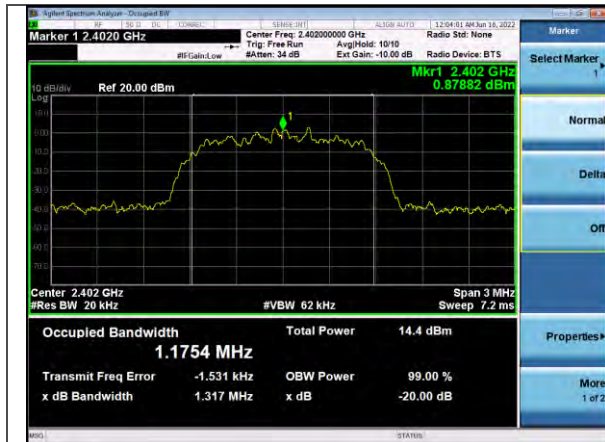
99% Occupied Bandwidth, Channel 38



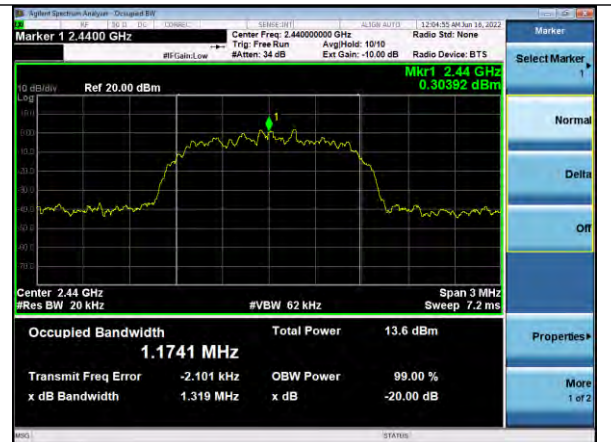
99% Occupied Bandwidth, Channel 78

Company: Honeywell International Inc.	Page 14 of 46	Name: A700x Series Devices (A710x, A720x, A730x)
Report: TR3584 E		Model: TAP1010-02, TAP1020-02, TAP1030-02
Quote: NBO-01-2022-004630		Serial: Engineering Sample

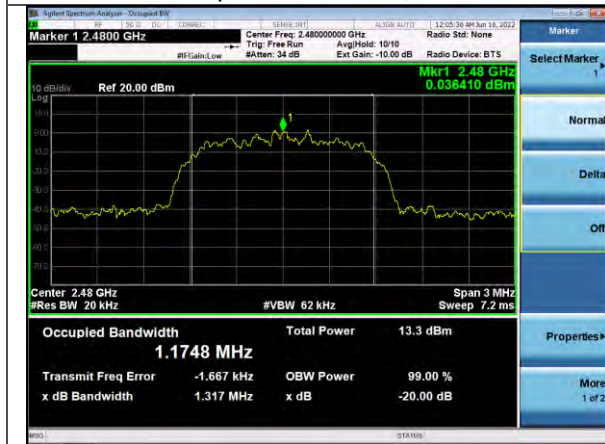
2-DH5



99% Occupied Bandwidth, Channel 0



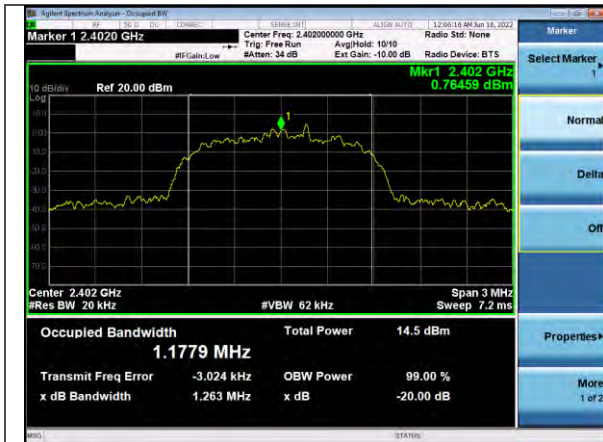
99% Occupied Bandwidth, Channel 38



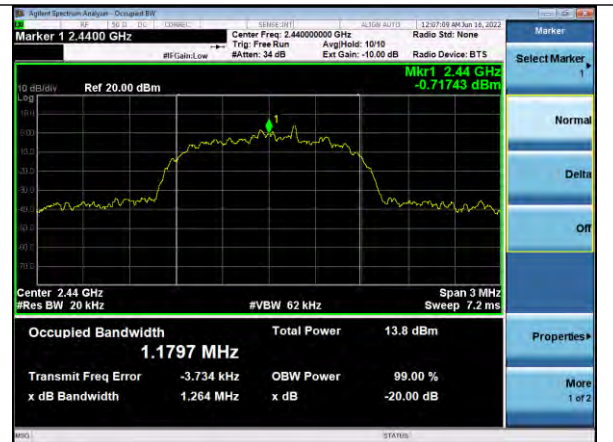
99% Occupied Bandwidth, Channel 78

Company: Honeywell International Inc.	Page 15 of 46	Name: A700x Series Devices (A710x, A720x, A730x)
Report: TR3584 E		Model: TAP1010-02, TAP1020-02, TAP1030-02
Quote: NBO-01-2022-004630		Serial: Engineering Sample

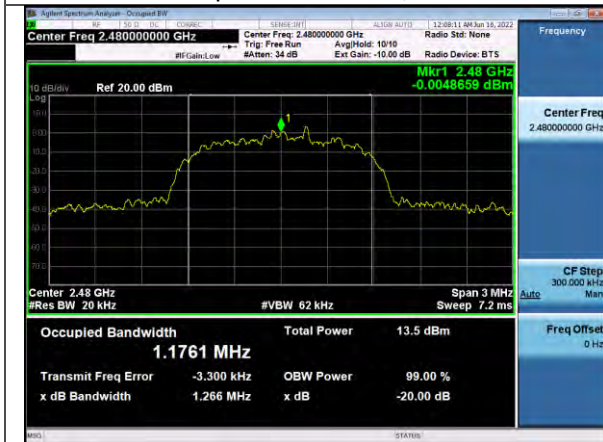
3-DH5



99% Occupied Bandwidth, Channel 0



99% Occupied Bandwidth, Channel 38



99% Occupied Bandwidth, Channel 78

Company: Honeywell International Inc.	Page 16 of 46	Name: A700x Series Devices (A710x, A720x, A730x)
Report: TR3584 E		Model: TAP1010-02, TAP1020-02, TAP1030-02
Quote: NBO-01-2022-004630		Serial: Engineering Sample

5.1.2 Output Power

Operator	Anthony Smith	QA	Zach Wilson
Temperature	21.4°C, 22°C, 21.8C	R.H. %	55.6%, 49.9%, 49.3%
Test Date	6/15/2022, 6/16/2022, 6/21/2022	Location	Conducted Radio Bench
Requirement	FCC 15.247, RSS-247	Method	ANSI C63.10 §7.8.5

Limits: 30 dBm

Test Parameters

Frequency	2402, 2440, 2480 MHz	Setup	Conducted
RBW	3 MHz	VBW	50 MHz
Detector(s)	Max peak hold	Sweep Time	Auto

EUT Parameters

Input Power	3.7VDC Battery	Mode	BT
Frequency	2402, 2440, 2480 MHz	Channel	0,38, 78

Data Table

Channel	Data Rate	Peak Output Power (dBm)	Limit (dBm)	Margin (dB)
0	DH5	10.1	30	19.9
0	2-DH5	9.3		20.7
0	3-DH5	9.6		20.4
38	DH5	9.5		20.5
38	2-DH5	8.6		21.4
38	3-DH5	8.9		21.1
78	DH5	9.2		20.8
78	2-DH5	8.4		21.6
78	3-DH5	8.7		21.3

Plots

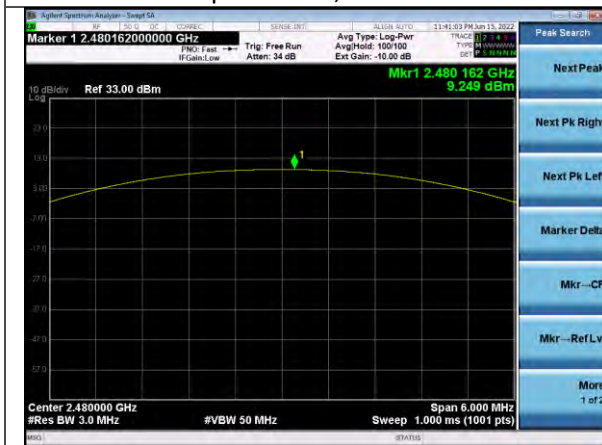
DH5



Output Power, Channel 0



Output Power, Channel 38



Output Power, Channel 78

2-DH5



Output Power, Channel 0



Output Power, Channel 38



Output Power, Channel 78

Company: Honeywell International Inc.	Page 19 of 46	Name: A700x Series Devices (A710x, A720x, A730x)
Report: TR3584 E		Model: TAP1010-02, TAP1020-02, TAP1030-02
Quote: NBO-01-2022-004630		Serial: Engineering Sample

3-DH5



Output Power, Channel 0



Output Power, Channel 38



Output Power, Channel 78

Company: Honeywell International Inc.	Page 20 of 46	Name: A700x Series Devices (A710x, A720x, A730x)
Report: TR3584 E		Model: TAP1010-02, TAP1020-02, TAP1030-02
Quote: NBO-01-2022-004630		Serial: Engineering Sample

5.1.3 Conducted Spurious Emissions

Operator	Anthony Smith	QA	Zach Wilson
Temperature	21.4°C, 22°C, 21.8C	R.H. %	55.6%, 49.9%, 49.3%
Test Date	6/15/2022, 6/16/2022, 6/21/2022	Location	Conducted Radio Bench
Requirement	FCC 15.247, RSS-247	Method	ANSI C63.10 §11.11, §11.12

Limits: 20 dBc

Reference Level = 9.7 dBm

Limit = -10.3 dBm

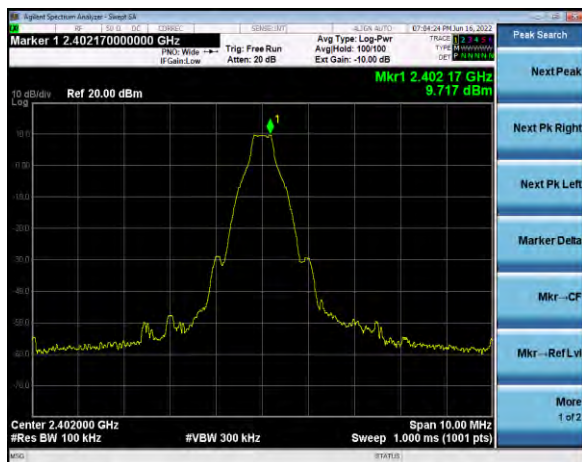
Test Parameters

Frequency	30 MHz – 25 GHz	Setup	Conducted
RBW	100 kHz	VBW	300 kHz
Detector(s)	Max peak hold	Sweep Time	Auto
Limit Calculation	Reference Level (dBm) – 20 dB = Limit (dBm)		

EUT Parameters

Input Power	3.7VDC Battery	Mode	BT
Frequency	2402, 2440, 2480 MHz	Channel	0, 38, 78
Data Rate/Modulation	DH5, 2-DH5, 3-DH5		

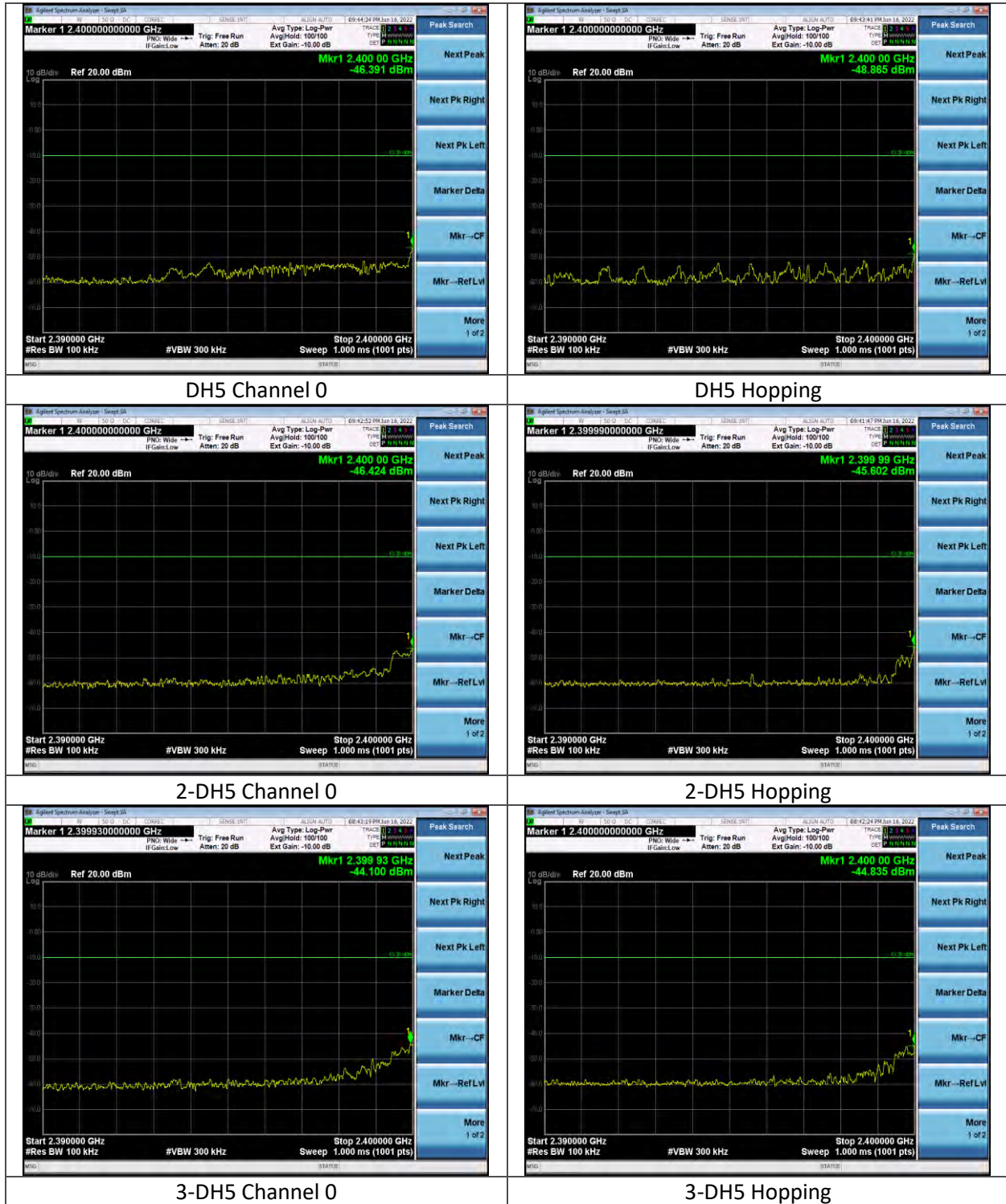
Reference Level Plot

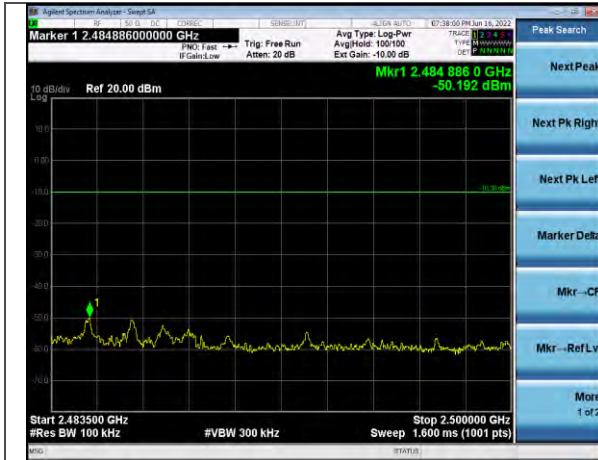


Data Tables

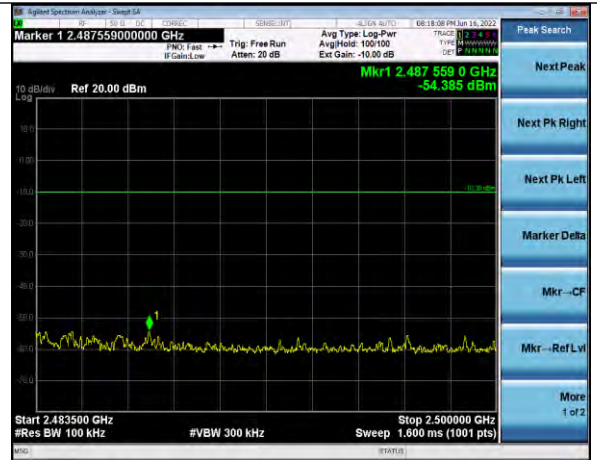
Frequency (MHz)	Measurement (dBm)	Limit (dBm)	Margin (dB)	Channel	Data Rate
2302.7	-43.76	-10.3	33.5	0	DH5
2506.0	-45.93	-10.3	35.6	0	DH5
2338.1	-46.15	-10.3	35.9	38	DH5
2542.0	-46.48	-10.3	36.2	38	DH5
2375.8	-44.39	-10.3	34.1	78	DH5
2585.5	-45.41	-10.3	35.1	78	DH5
2484.9	-50.19	-10.3	39.9	78	DH5
2487.6	-54.39	-10.3	44.1	Hopping	DH5
2485.0	-50.3	-10.3	40.0	78	2-DH5
2488.0	-57.9	-10.3	47.6	Hopping	2-DH5
2485.0	-51.3	-10.3	41.0	78	3-DH5
2484.0	-57.6	-10.3	47.3	Hopping	3-DH5
2400.0	-44.8	-10.3	34.5	Hopping	3-DH5
2399.9	-44.1	-10.3	33.8	0	3-DH5
2400.0	-45.6	-10.3	35.3	Hopping	2-DH5
2400.0	-46.4	-10.3	36.1	0	2-DH5
2400.0	-48.9	-10.3	38.6	Hopping	DH5
2400.0	-46.4	-10.3	36.1	0	DH5

Plots

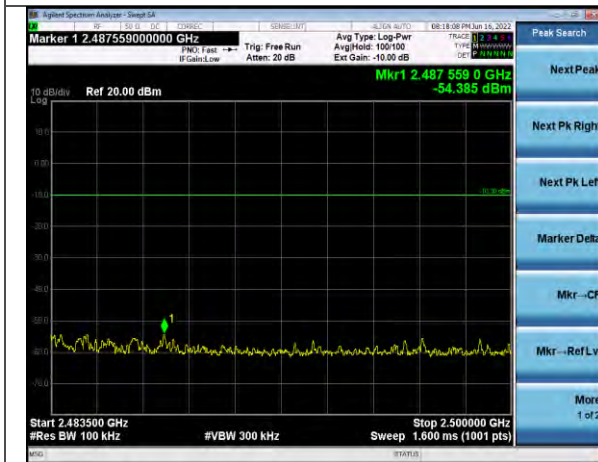




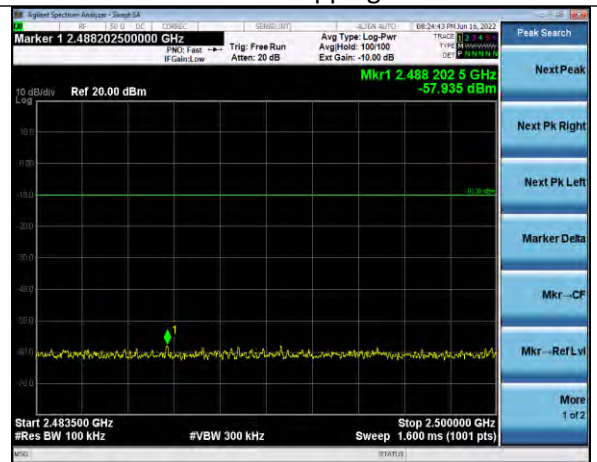
DH5 Channel 78



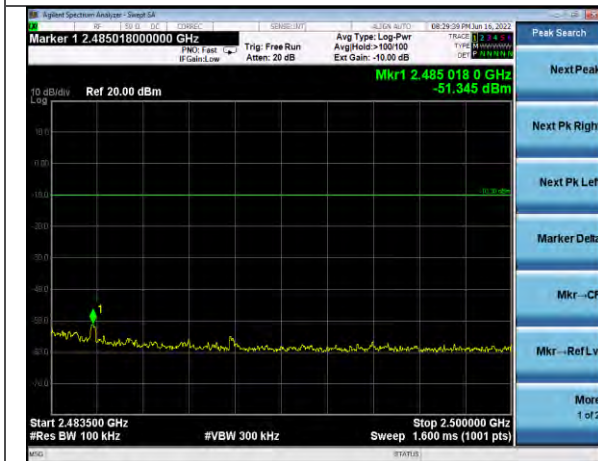
DH5 Hopping



2-DH5 Channel 78



2-DH5 Hopping



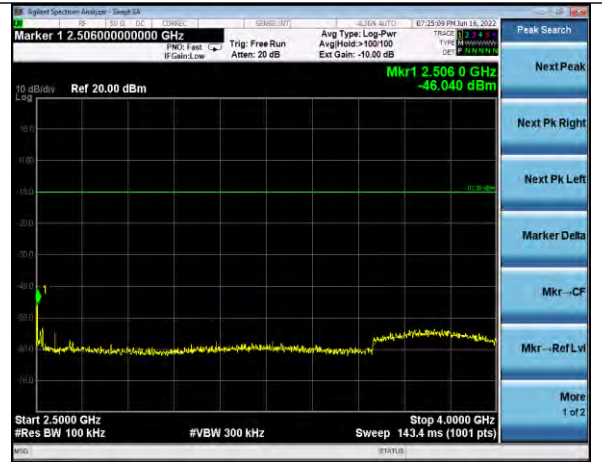
3-DH5 Channel 78



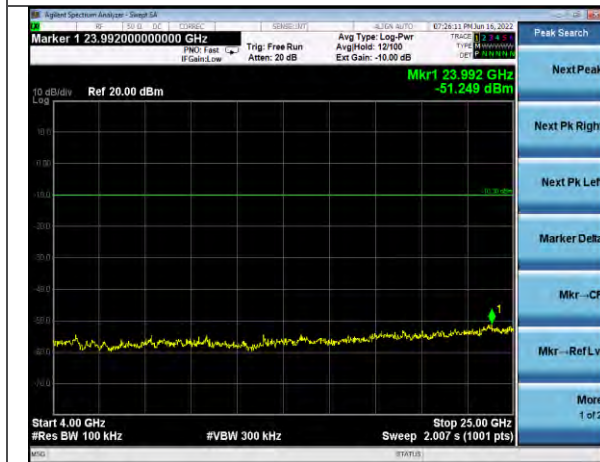
3-DH5 Hopping



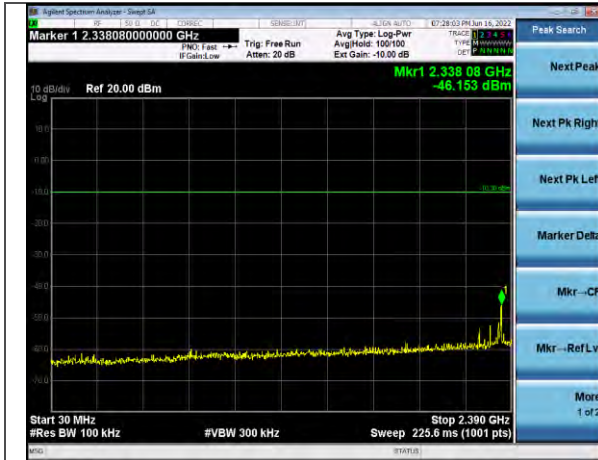
DH5 30-2390 MHz Channel 0



DH5 2500-4000 MHz Channel 0



DH5 4000-25000 MHz Channel 0



DH5 30-2390 MHz Channel 38

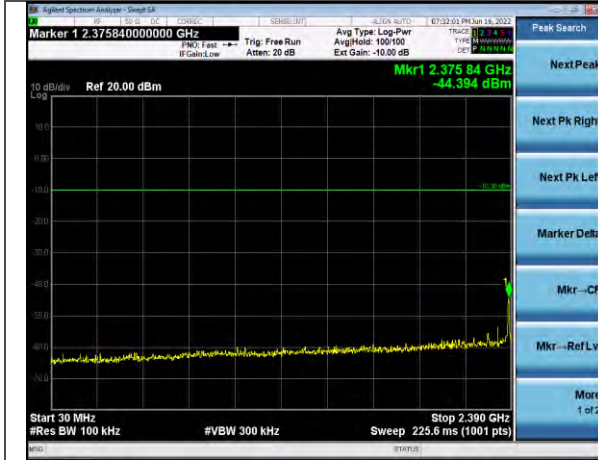


DH5 2500-4000 MHz Channel 38

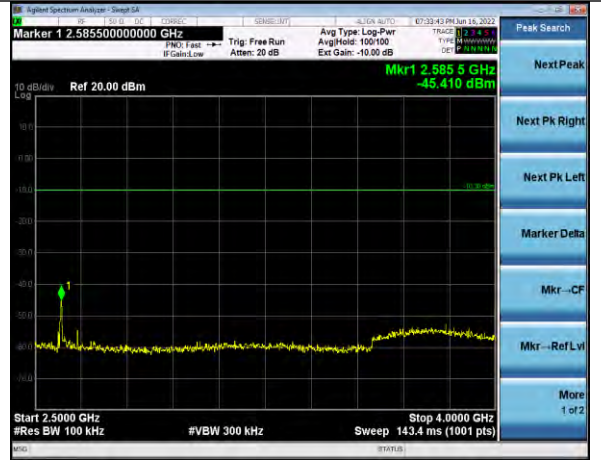


DH5 4000-25000 MHz Channel 38

Company: Honeywell International Inc.	Page 26 of 46	Name: A700x Series Devices (A710x, A720x, A730x)
Report: TR3584 E		Model: TAP1010-02, TAP1020-02, TAP1030-02
Quote: NBO-01-2022-004630		Serial: Engineering Sample



DH5 30-2390 MHz Channel 78



DH5 2500-4000 MHz Channel 78



DH5 4000-25000 MHz Channel 78

Company: Honeywell International Inc.	Page 27 of 46	Name: A700x Series Devices (A710x, A720x, A730x)
Report: TR3584 E		Model: TAP1010-02, TAP1020-02, TAP1030-02
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5.1.4 Frequency Stability

Operator	Anthony Smith	QA	Zach Wilson
Temperature	21.4°C, 22°C, 21.8C	R.H. %	55.6%, 49.9%, 49.3%
Test Date	6/15/2022, 6/16/2022, 6/21/2022	Location	Conducted Radio Bench
Requirement	FCC 2.1055	Method	ANSI C63.10

Limits: Reported

Test Parameters

Frequency	2402, 2440, 2480 MHz	Setup	Conducted
RBW	1 kHz	VBW	3 kHz

EUT Parameters

Input Power	3.3, 3.6, 4.1 VDC via DC Lab Supply	Mode	BT CW
Frequency	2402, 2440, 2480 MHz	Channel	0, 38, 78

Data Table

Channel	Frequency (Hz) 3.3VDC	Frequency (Hz) 3.6VDC	Frequency (Hz) 4.1VDC	Deviation (Hz)
0	2402034421	2401986676	2402032390	47745
38	2439959629	2439961867	2439957599	4268
78	2479965834	2480038785	2480039388	73554

5.1.5 FHSS

Operator	Anthony Smith	QA	Zach Wilson
Temperature	21.4°C, 22°C, 21.8C	R.H. %	55.6%, 49.9%, 49.3%
Test Date	6/15/2022, 6/16/2022, 6/21/2022	Location	Conducted Radio Bench
Requirement	FCC 15.247	Method	ANSI C63.10 §7.8.2, 7.8.3, 7.8.4

Limits: Channels separated by two-thirds of the 20 dB bandwidth of the hopping channel. Usage of at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed (0.4s * 79 channels = 31.6s).

Test Parameters

Frequency	2402-2480 MHz	Setup	Conducted
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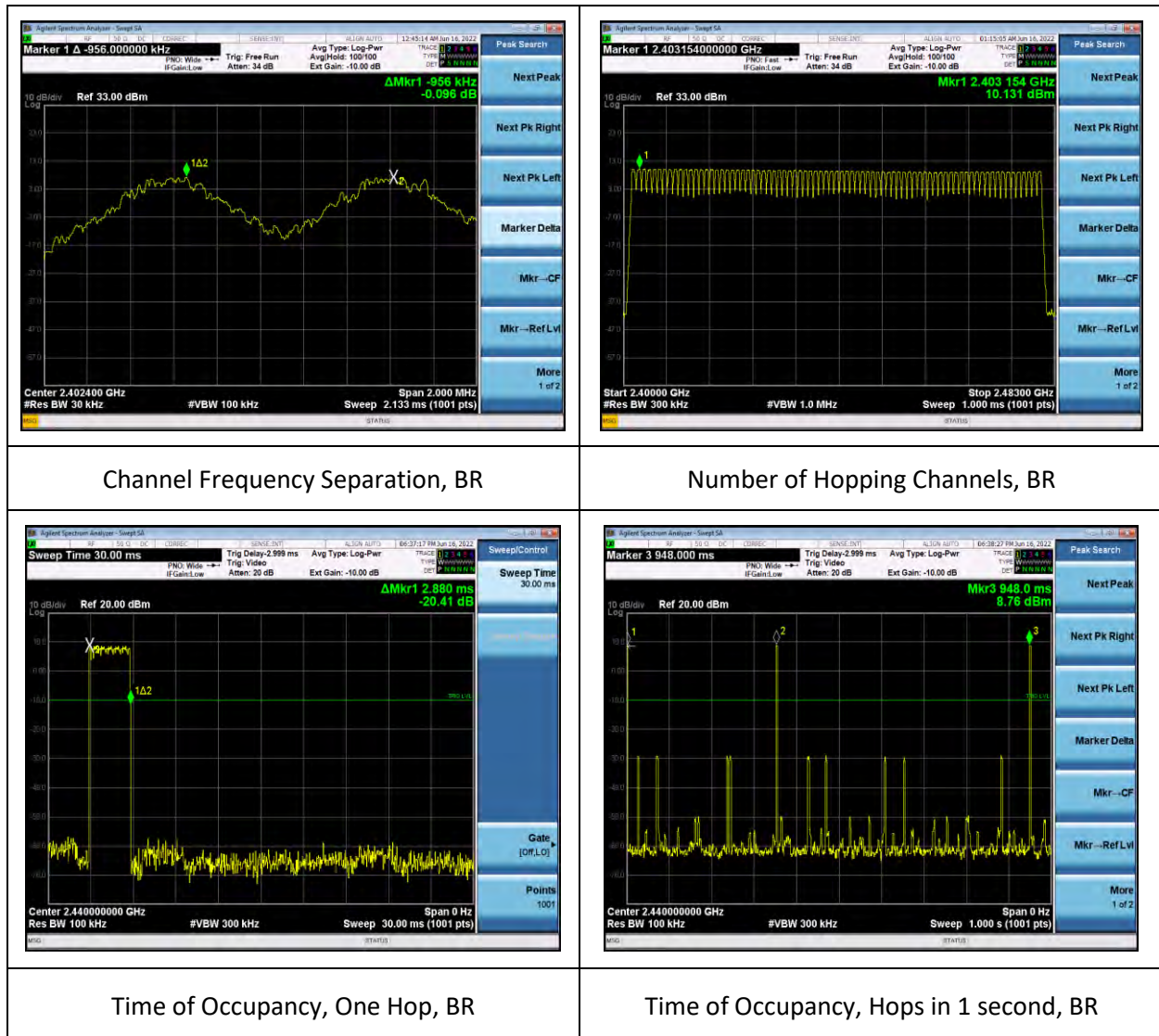
EUT Parameters

Input Power	3.7VDC Battery	Mode	Bluetooth Classic Hopping BR, EDR2, EDR3
Frequency	2402-2480 MHz	Channel	Hopping 0-78

Data Table

Data Rate	Frequency Separation (kHz)	Number of channels	Time of a single hop (ms)	Average time of Occupancy over 31.6 s (ms)
DH5	956	79	2.88	276
2-DH5	997	79	1.41	180
3-DH5	986	79	1.07	137

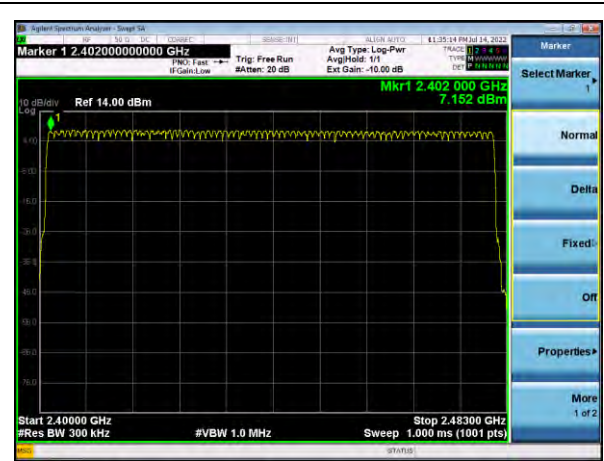
BR Plots



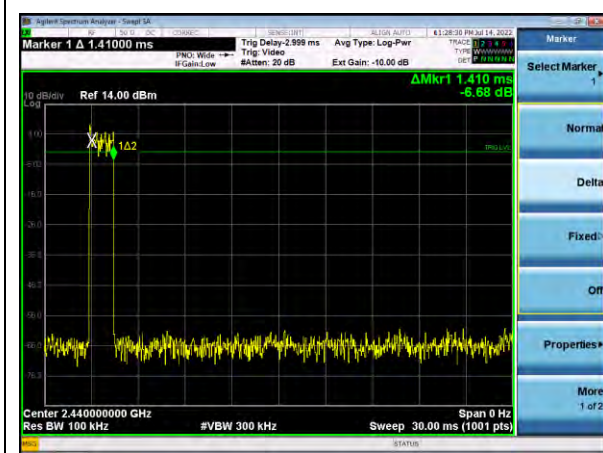
EDR2 Plots



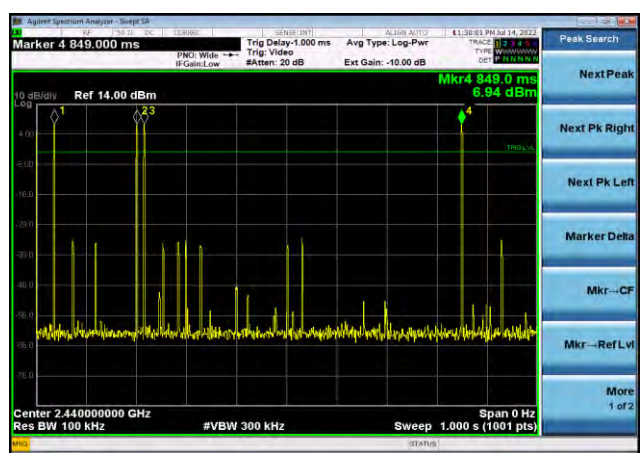
Channel Frequency Separation, EDR2



Number of Hopping Channels, EDR2



Time of Occupancy, One Hop, EDR2

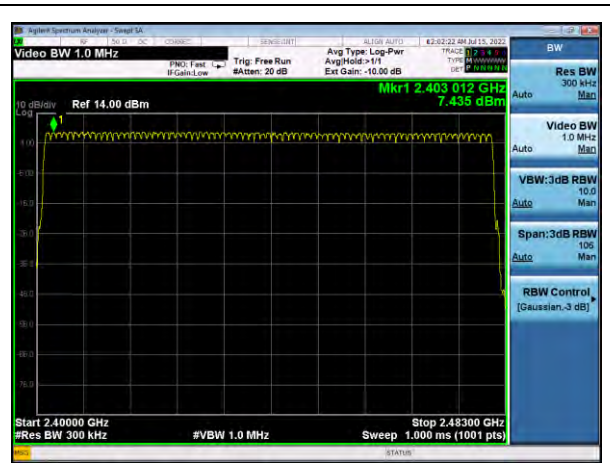


Time of Occupancy, Hops per 1s, EDR2

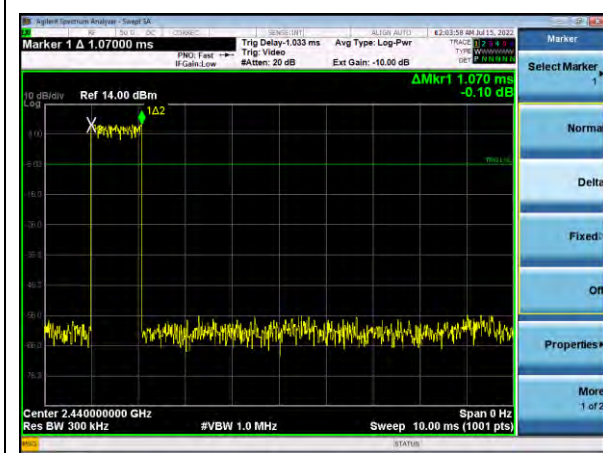
EDR3 Plots



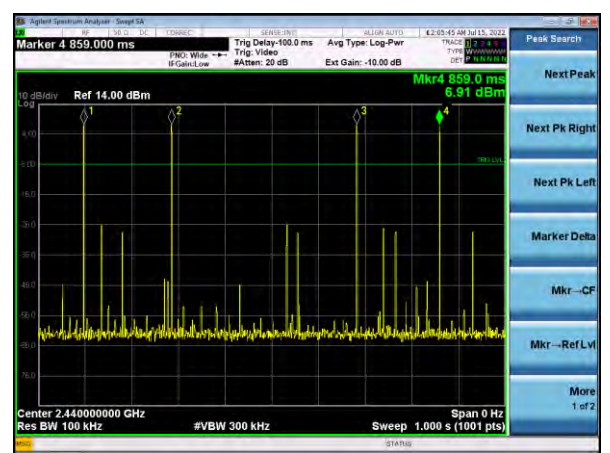
Channel Frequency Delay Separation, EDR3



Number of Hopping Channels, EDR3



Time of Occupancy, One Hop, EDR3



Time of Occupancy, Hops per 1s, EDR3

5.2 Radiated Emissions

<p>Description of Measurement</p>	<p>The frequency spectrum is investigated for intentional and / or unintentional signals emanating from the EUT by use of a standardized test site and measurement antenna.</p> <p>The antenna, cable, pre-amp, and other necessary measurement system correction factors are loaded onto the EMI receiver / spectrum analyzer when the measurements are performed allowing the data to be gathered and reported as corrected values.</p> <p>The maximum emissions from the EUT are determined by turn-table azimuth rotation (360°) and scanning of the measurement antenna. Maximized levels are noted at degree values of azimuth, measurement antenna height, and measurement antenna polarity.</p>
<p>Example Calculations</p>	<p>Measurement (dBμV) + Cable factor (dB) + Other (dB) + Antenna Factor (dB/m) = Corrected Reading (dBμV/m)</p> <p>Margin (dB) = Limit (dBμV/m) - Corrected Reading (dBμV/m)</p> <p>Example at 4000 MHz: Reading = 40 dBμV + 3.4 dB + 0.9 dB + 6.5 dB/m = 50.8 dBμV/m Average Limit = 20 log (500) = 54 dBμV/m Margin = 54 dBμV/m - 50.8 dBμV/m = 3.2 dB</p>

Block Diagram



Instrumentation

Asset #	Description	Manufacturer	Model #	Serial #	Date	Due Date	Status
AA 960007	Antenna - Double Ridge Horn	EMCO	3115	9311-4138	8/23/2021	8/23/2022	Active Calibration
AA 960174	Antenna - Small Horn	ETS Lindgren	3116C-PA	00206880	9/1/2021	9/1/2022	Active Calibration
AA 960194	Antenna - Biconical	A.H. Systems, Inc.	SAS-540	780	9/2/2021	9/2/2022	Active Calibration
AA 960195	Antenna - Log Periodic	A.H. Systems, Inc.	SAS-512-2	557	8/17/2021	8/17/2022	Active Calibration
EE 960085	Analyzer - EMI Receiver	Agilent	N9038A	MY51210148	4/11/2022	4/11/2023	Active Calibration
EE 960171	Chamber 5 - UFA	Panashield	none	none	2/22/2022	2/22/2023	Active Validation
EE 960171	Chamber 5 - Svswr	Panashield	none	none	3/14/2022	3/14/2023	Active Validation
EE 960171	Chamber 5 - NSA	Panashield	none	none	3/17/2022	3/17/2023	Active Validation
EE 960203	Analyzer - EMI Receiver	Keysight	N9038A	MY56400072	4/13/2022	4/13/2023	Active Calibration
LSC-300	Cable	Chamber 3 Emissions	-	-	4/26/2022	4/26/2023	Active Verification
LSC-500	Cable	Chamber 5 Emissions	-	-	4/25/2022	4/25/2023	Active Verification

Company: Honeywell International Inc.	Page 33 of 46	Name: A700x Series Devices (A710x, A720x, A730x)
Report: TR3584 E		Model: TAP1010-02, TAP1020-02, TAP1030-02
Quote: NBO-01-2022-004630		Serial: Engineering Sample

5.2.1 Radiated Emissions

Operator	Jon Dilley Ivan Alvarez	QA	Alec Krabbe Braden Smith
Temperature	21.6°C to 25.3°C	R.H. %	45.9% to 56.0%
Test Date	6/15/2022, 6/16/2022	Location	Chamber 5, Chamber 3
Requirement	FCC 15.209	Method	ANSI C63.10

Limits:

Frequency (MHz)	Quasi-Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Peak Limit (dBμV/m)
30-88	40.0	-	-
88-216	43.5	-	-
216-960	46.0	-	-
960-1000	54.0	-	-
1000-25000	-	54.0	74.0

Test Parameters

Frequency	30 MHz to 25 GHz	Distance	3m
Detector(s)	Quasi peak detector for measurements under 1 GHz. Average measurements made with a reduced VBW of 16 kHz. Max peak hold for plots.	Table height	80cm (below 1 GHz) 150cm (above 1 GHz)
RBW	120 kHz (below 1 GHz) 1 MHz (above 1 GHz)	VBW	1.2 MHz (below 1 GHz) 3 MHz (above 1 GHz peak) 16 kHz (above 1 GHz average) 30 kHz for emission identification
Plots	Worst case plots shown.	EUT Orientations	Flat, Vertical, Horizontal

EUT Parameters

Input Power	3.7VDC via battery	Mode	BT
Channel	0, 38, 78	Data Rate/Modulation	BR, EDR2, EDR3

Data Tables

30-1000 MHz

Frequency (MHz)	Antenna Polarity	Height (cm)	Azimuth (degree)	Quasi-Peak Reading (dB μ V/m)	Quasi-Peak Limit (dB μ V/m)	Quasi-Peak Margin (dB)
197.4	Horizontal	100	0	24.4	43.5	19.1
197.8	Vertical	100	0	24.4	43.5	19.1
986.6	Horizontal	100	0	30.8	54.0	23.2
985.8	Vertical	100	0	30.8	54.0	23.2

4-25 GHz

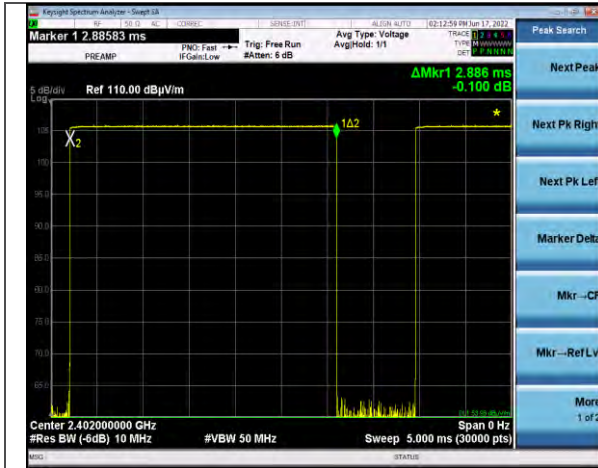
Frequency (MHz)	Antenna Polarity	Height (cm)	Azimuth (degree)	Average Reading (dB μ V/m)	Average Limit (dB μ V/m)	Average Margin (dB)	Peak Reading (dB μ V/m)	Peak Limit (dB μ V/m)	Peak Margin (dB)	EUT Orientation
4880.0	H	100	320	48.3	54.0	5.7	53.2	74.0	20.8	Vertical
4880.0	V	200	300	47.8	54.0	6.2	52.6	74.0	21.4	Vertical
4880.0	V	100	283	52.5	54.0	1.5	56.9	74.0	17.1	Flat
4880.0	H	100	346	48.1	54.0	5.9	52.1	74.0	21.9	Flat
4880.0	V	100	88	51.9	54.0	2.1	56.1	74.0	17.9	Horizontal
4880.0	H	150	308	47.9	54.0	6.1	50.4	74.0	23.6	Horizontal

1-4 GHz

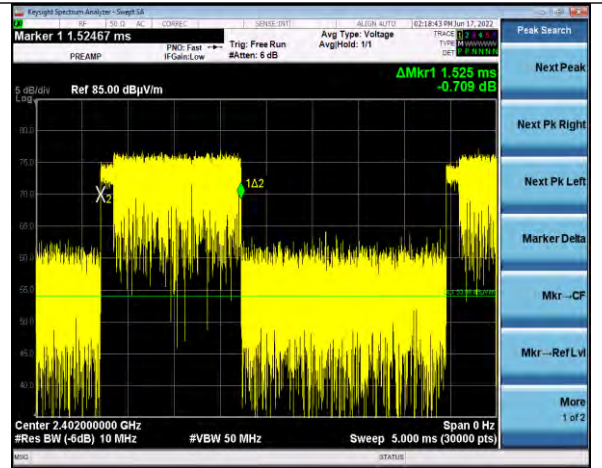
Average							
Frequency (MHz)	Antenna Polarity	Height (cm)	Azimuth (degree)	Average (dB μ V/m)	Average Limit (dB μ V/m)	Average Margin (dB)	Note
2380.1	Vertical	150	296	43.9	54.0	10.1	EDR3 CH0
2376.7	Vertical	150	296	43.8	54.0	10.2	EDR3 Hopping
2494.5	Vertical	150	296	44.2	54.0	9.8	EDR3 Hopping
2498.2	Vertical	150	296	44.3	54.0	9.7	EDR3 CH78
2494.5	Vertical	150	296	44.0	54.0	10.0	EDR2 CH78
2495.2	Vertical	150	296	43.9	54.0	10.1	EDR2 Hopping
2384.8	Vertical	150	296	43.6	54.0	10.4	EDR2 Hopping
2380.9	Vertical	150	296	43.6	54.0	10.4	EDR2 CH0
2389.7	Vertical	150	296	43.9	54.0	10.1	BR CH0
2357.6	Vertical	150	296	45.9	54.0	8.1	BR Hopping
2483.6	Vertical	150	296	44.9	54.0	9.1	BR Hopping
2484.8	Vertical	150	296	44.8	54.0	9.2	BR CH78

Peak							
Frequency (MHz)	Antenna Polarity	Height (cm)	Azimuth (degree)	Peak Reading (dB μ V/m)	Peak Limit (dB μ V/m)	Peak Margin (dB)	Note
2332.7	Vertical	150	296	55.4	74.0	18.6	EDR3 CH0
2366.7	Vertical	150	296	55.4	74.0	18.6	EDR3 Hopping
2497.6	Vertical	150	296	56.4	74.0	17.6	EDR3 Hopping
2491.2	Vertical	150	296	55.7	74.0	18.3	EDR3 CH78
2495.4	Vertical	150	296	55.7	74.0	18.3	EDR2 CH78
2491.9	Vertical	150	296	55.2	74.0	18.8	EDR2 Hopping
2372.3	Vertical	150	296	55.3	74.0	18.7	EDR2 Hopping
2357.2	Vertical	150	296	54.7	74.0	19.3	EDR2 CH0
2378.2	Vertical	150	296	55.5	74.0	18.5	BR CH0
2351.2	Vertical	150	296	57.2	74.0	16.8	BR Hopping
2497.2	Vertical	150	296	56.4	74.0	17.6	BR Hopping
2483.6	Vertical	150	296	57.8	74.0	16.2	BR CH78

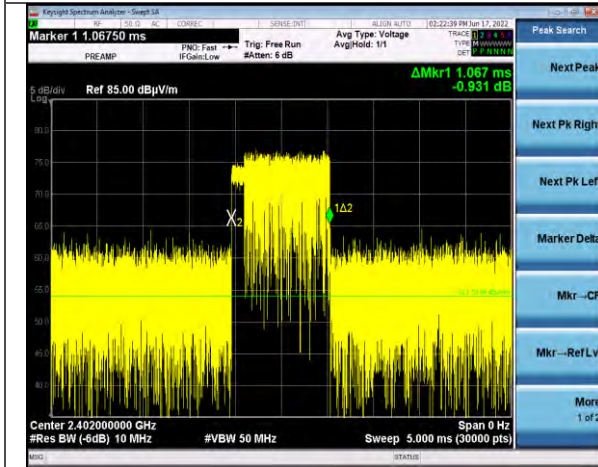
Duty Cycle Plots (for average measurements)



DH5 (360 Hz)



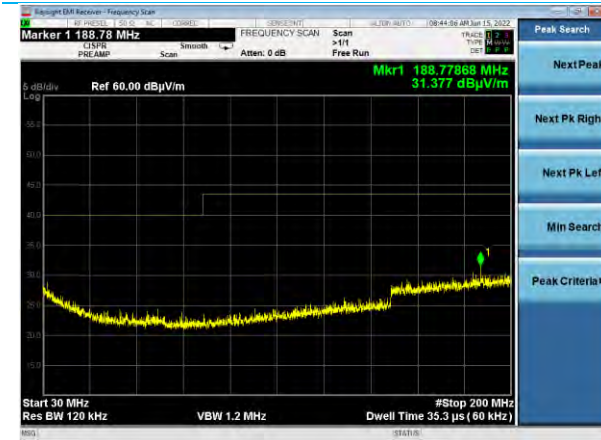
2-DH5 (680 Hz)



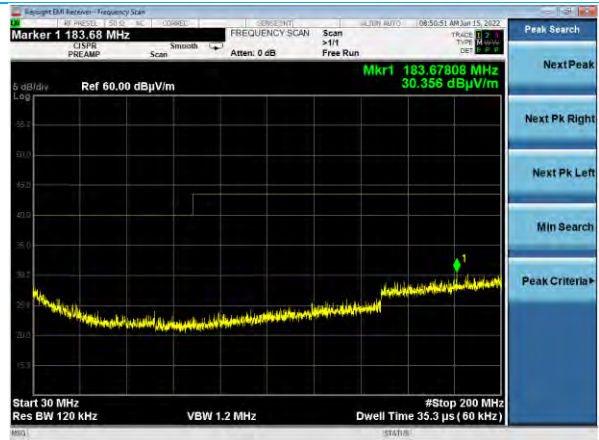
3-DH5 (1 kHz)

Company: Honeywell International Inc.	Page 37 of 46	Name: A700x Series Devices (A710x, A720x, A730x)
Report: TR3584 E		Model: TAP1010-02, TAP1020-02, TAP1030-02
Quote: NBO-01-2022-004630		Serial: Engineering Sample

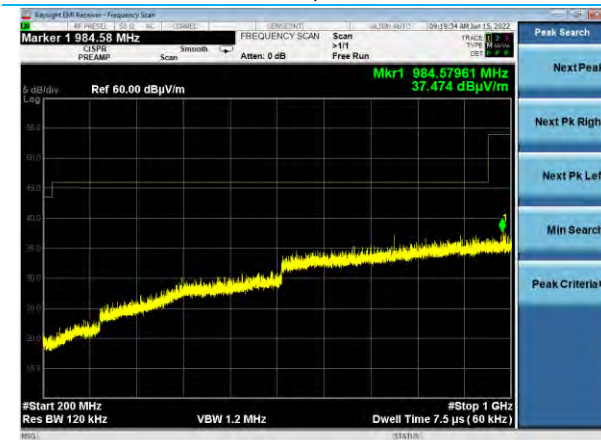
Plots



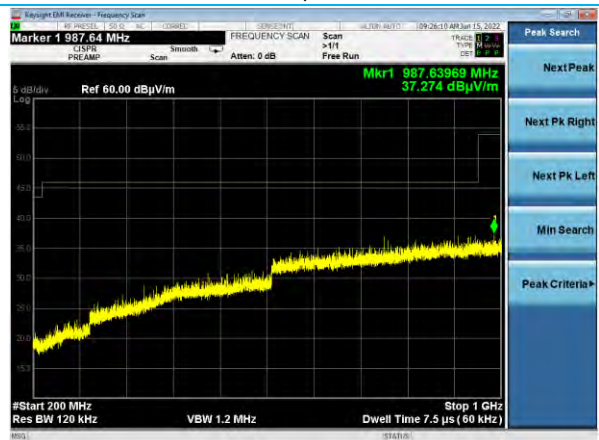
30-200 MHz, Horizontal Antenna
Vertical EUT, Channel 38



30-200 MHz, Vertical Antenna
Vertical EUT, Channel 38

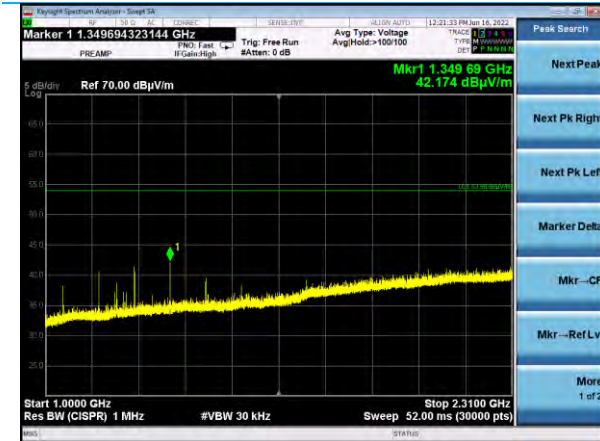


200-1000 MHz, Horizontal Antenna
Vertical EUT, Channel 38

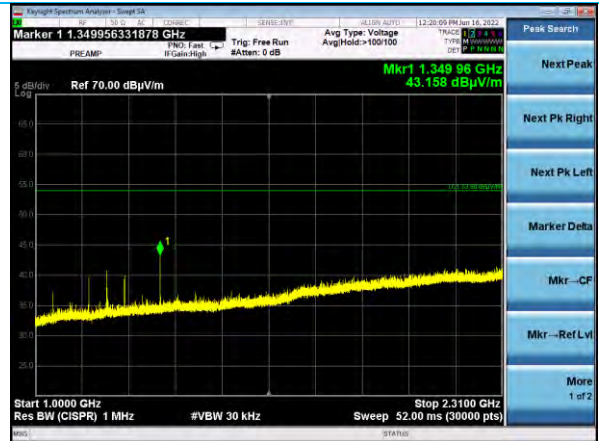


200-1000 MHz, Vertical Antenna
Vertical EUT, Channel 38

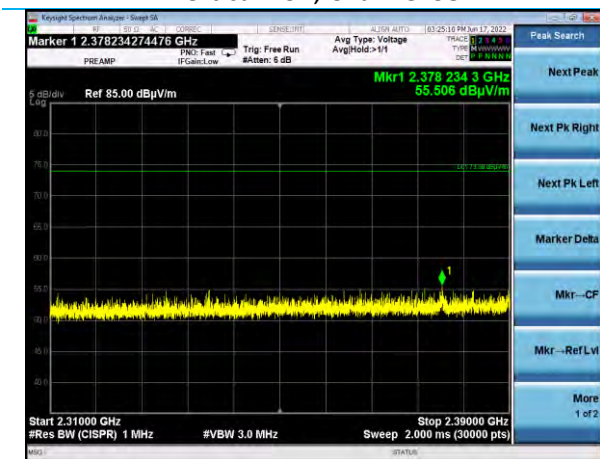
Company: Honeywell International Inc.	Page 38 of 46	Name: A700x Series Devices (A710x, A720x, A730x)
Report: TR3584 E		Model: TAP1010-02, TAP1020-02, TAP1030-02
Quote: NBO-01-2022-004630		Serial: Engineering Sample



1-2.31 GHz, Horizontal Antenna
Vertical EUT, Channel 38



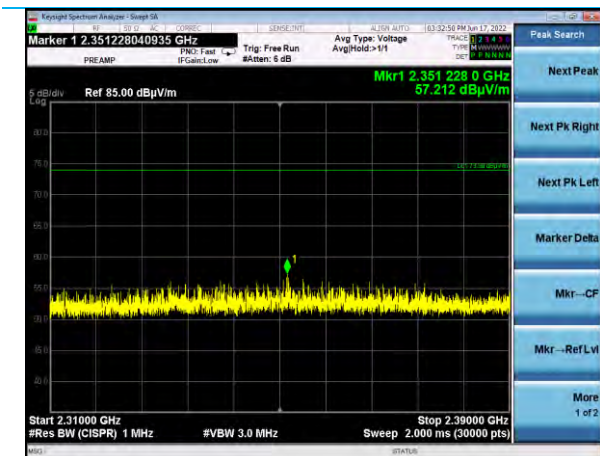
1-2.31 GHz, Vertical Antenna
Vertical EUT, Channel 38



DH5 2.31-2.39 GHz, Vertical Antenna
Horizontal EUT, Channel 0
Peak



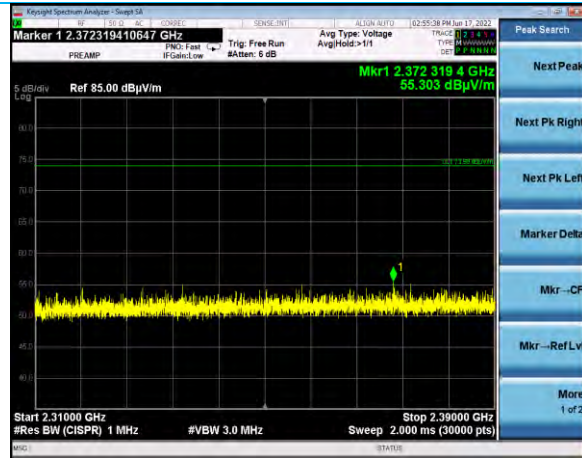
DH5 2.31-2.39 GHz, Vertical Antenna
Horizontal EUT, Channel 0
Average



DH5 2.31-2.39 GHz, Vertical Antenna
Horizontal EUT, Hopping
Peak



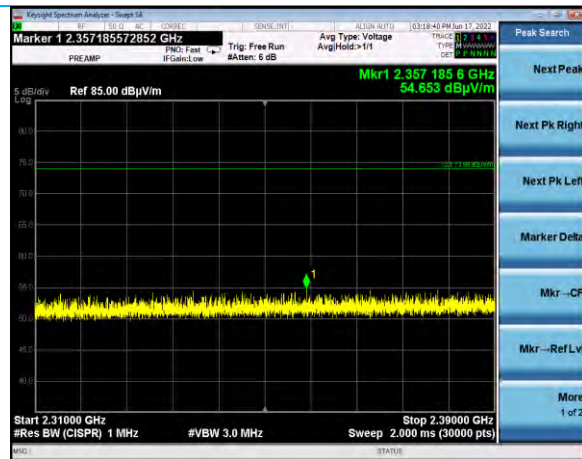
DH5 2.31-2.39 GHz, Vertical Antenna
Horizontal EUT, Hopping
Average



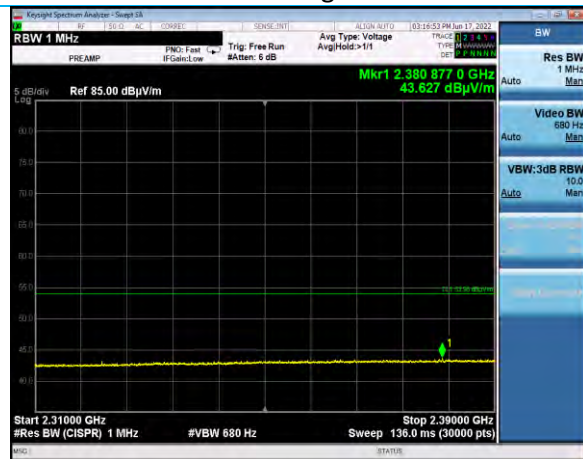
2-DH5 2.31-2.39 GHz, Vertical Antenna
Horizontal EUT, Hopping
Peak



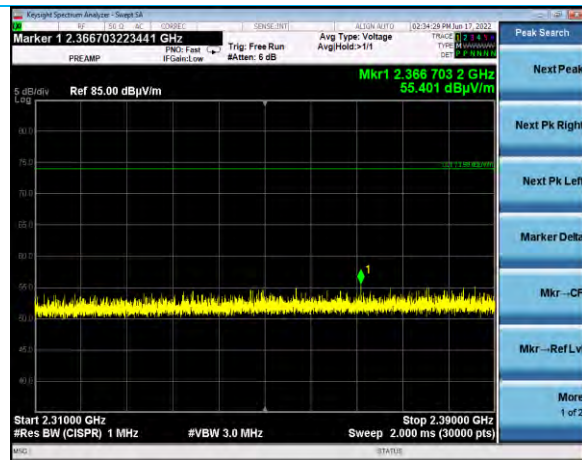
2-DH5 2.31-2.39 GHz, Vertical Antenna
Horizontal EUT, Hopping
Average



2-DH5 2.31-2.39 GHz, Vertical Antenna
Horizontal EUT, Channel 0
Peak



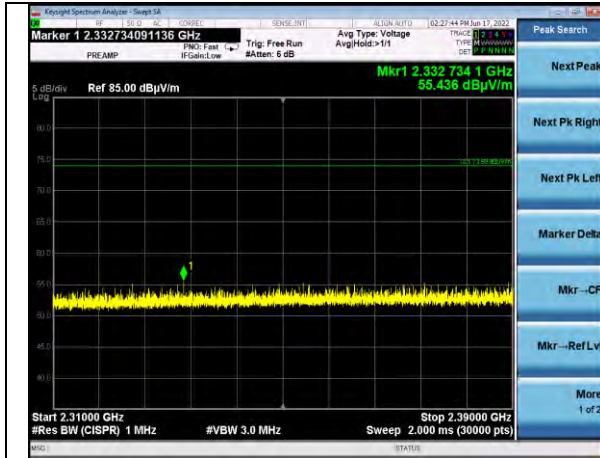
2-DH5 2.31-2.39 GHz, Vertical Antenna
Horizontal EUT, Channel 0
Average



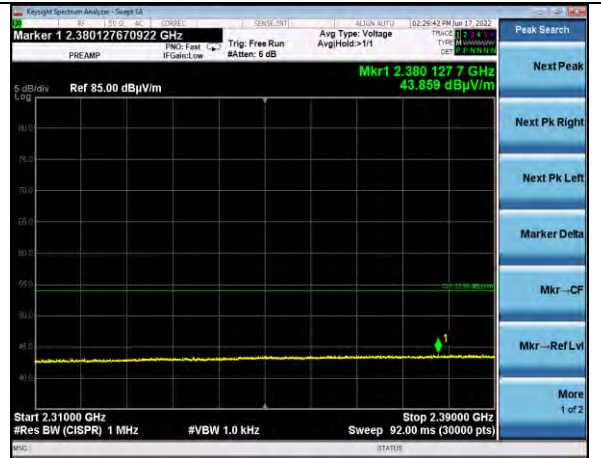
3-DH5 2.31-2.39 GHz, Vertical Antenna
Horizontal EUT, Hopping
Peak



3-DH5 2.31-2.39 GHz, Vertical Antenna
Horizontal EUT, Hopping
Average

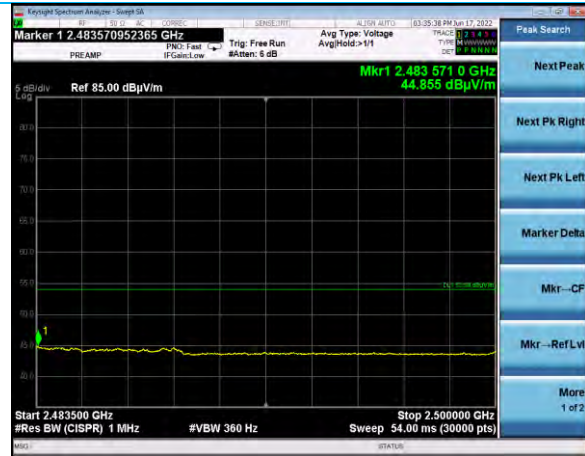
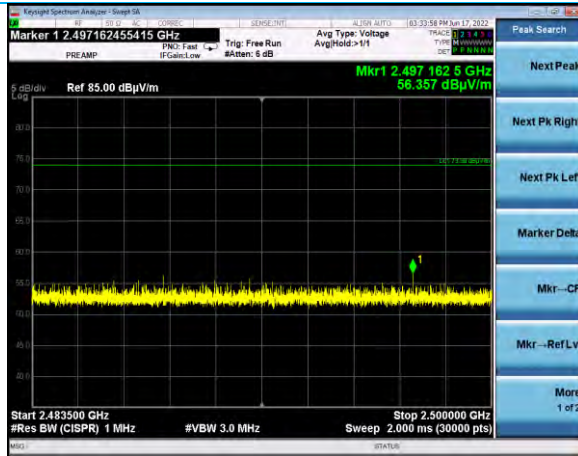


3-DH5 2.31-2.39 GHz, Vertical Antenna
Horizontal EUT, Channel 0
Peak



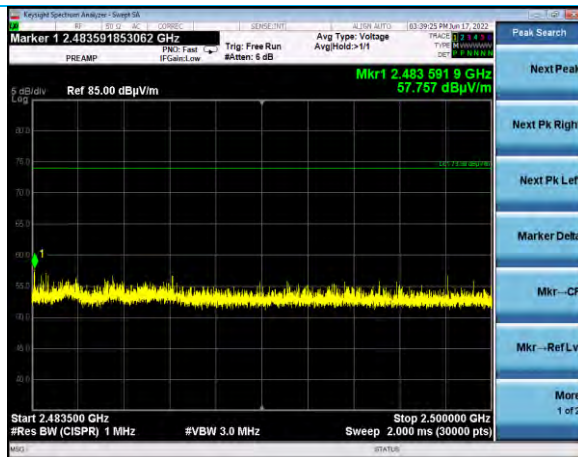
3-DH5 2.31-2.39 GHz, Vertical Antenna
Horizontal EUT, Channel 0
Average

Company: Honeywell International Inc.	Page 41 of 46	Name: A700x Series Devices (A710x, A720x, A730x)
Report: TR3584 E		Model: TAP1010-02, TAP1020-02, TAP1030-02
Quote: NBO-01-2022-004630		Serial: Engineering Sample



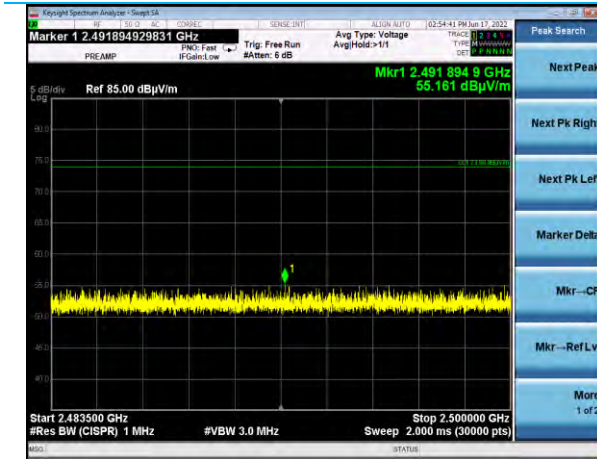
DH5 2.4835-2500 GHz, Vertical Antenna
Horizontal EUT, Hopping
Peak

DH5 2.4835-2500 GHz, Vertical Antenna
Horizontal EUT, Hopping
Average

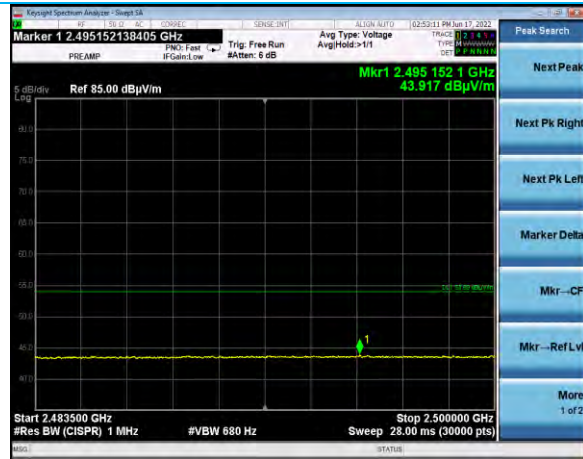


DH5 2.4835-2500 GHz, Vertical Antenna
Horizontal EUT, Channel 78
Peak

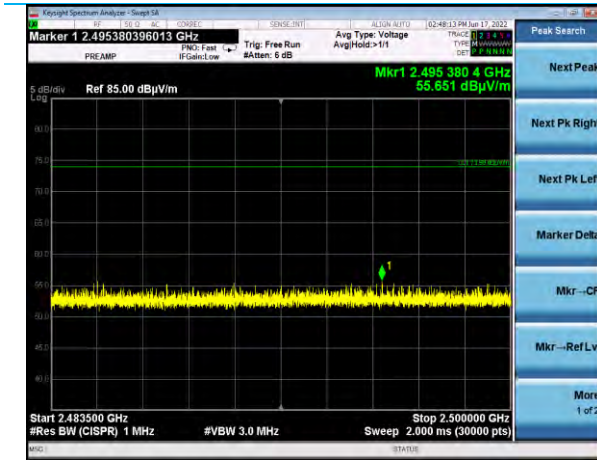
DH5 2.4835-2500 GHz, Vertical Antenna
Horizontal EUT, Channel 78
Average



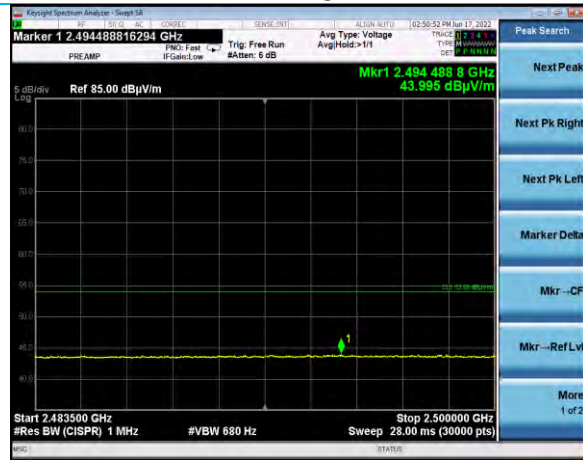
2-DH5 2.4835-2500 GHz, Vertical Antenna
Horizontal EUT, Hopping
Peak



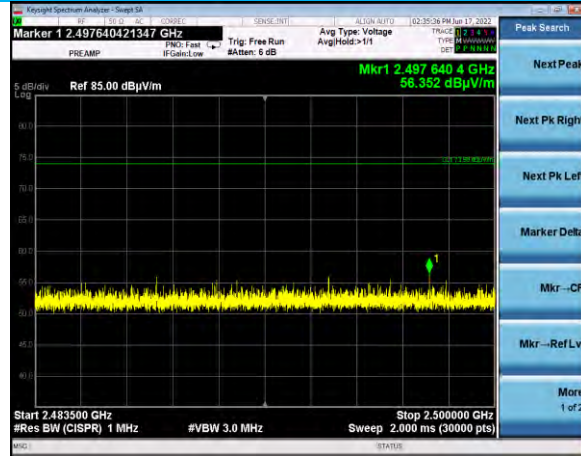
2-DH5 2.4835-2500 GHz, Vertical Antenna
Horizontal EUT, Hopping
Average



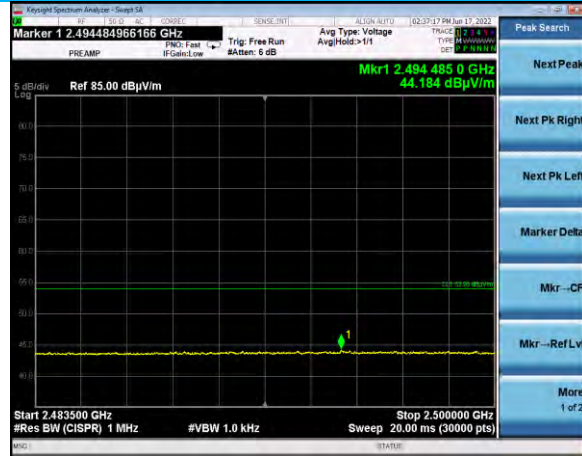
2-DH5 2.4835-2500 GHz, Vertical Antenna
Horizontal EUT, Channel 78
Peak



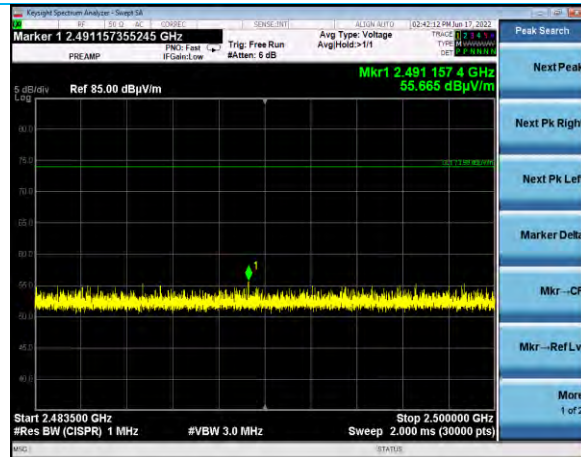
2-DH5 2.4835-2500 GHz, Vertical Antenna
Horizontal EUT, Channel 78
Average



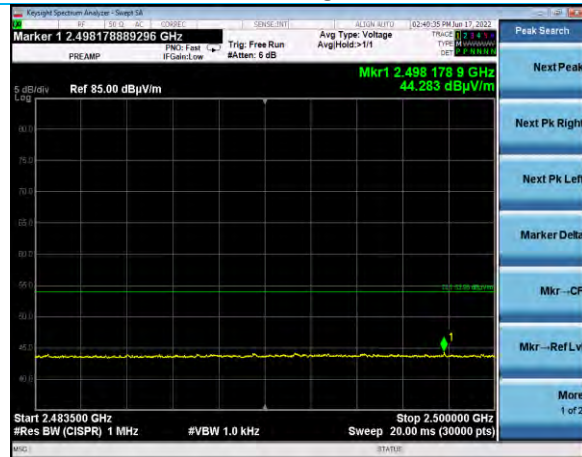
3-DH5 2.4835-2500 GHz, Vertical Antenna
Horizontal EUT, Hopping
Peak



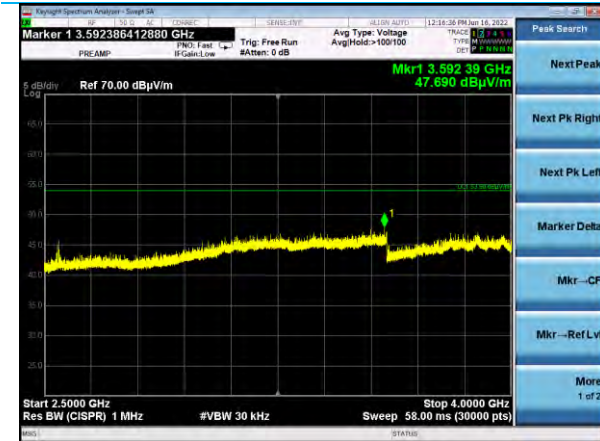
3-DH5 2.4835-2500 GHz, Vertical Antenna
Horizontal EUT, Hopping
Average



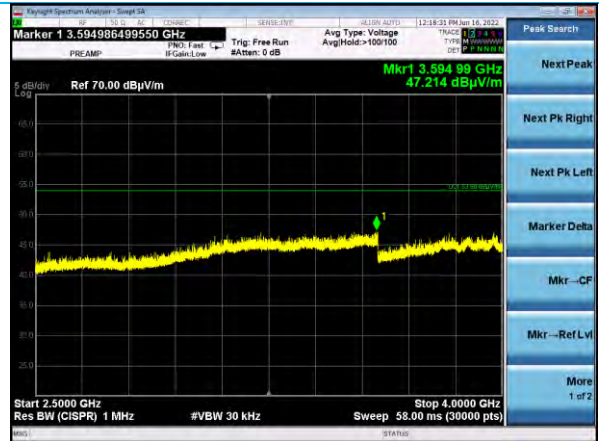
3-DH5 2.4835-2500 GHz, Vertical Antenna
Horizontal EUT, Channel 78
Peak



3-DH5 2.4835-2500 GHz, Vertical Antenna
Horizontal EUT, Channel 78
Average



2.5-4 GHz, Horizontal Antenna
Vertical EUT, Channel 38



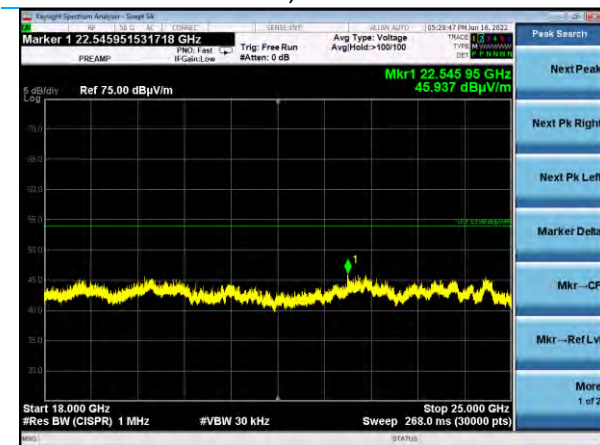
2.5-4 GHz, Vertical Antenna
Vertical EUT, Channel 38



4-18 GHz, Vertical Antenna
Flat EUT, Channel 38



4-18 GHz, Vertical Antenna
Horizontal EUT, Channel 38



18-25 GHz, Horizontal Antenna
Flat EUT, Channel 38



18-25 GHz, Vertical Antenna
Flat EUT, Channel 38

Company: Honeywell International Inc.	Page 45 of 46	Name: A700x Series Devices (A710x, A720x, A730x)
Report: TR3584 E		Model: TAP1010-02, TAP1020-02, TAP1030-02
Quote: NBO-01-2022-004630		Serial: Engineering Sample

6 REVISION HISTORY

Version	Date	Notes	Person
0	7/6/2022	Initial Draft	Zach Wilson
1	7/6/2022	Final	Zach Wilson
2	8/11/2022	Corrections per TCB comments	Adam Alger
3	9/15/2022	Update antenna gain	Adam Alger

END OF REPORT