

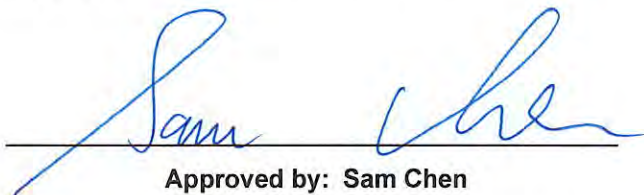


RADIO TEST REPORT

FCC ID : XHG-CG770
Equipment : CPE
Brand Name : Jextream
Model Name : CG770
Applicant : Franklin Technology Inc.
906 JEI Platz, 186, Gasan digital 1-ro, Gumcheon-Gu,
Seoul, South Korea, 08502
Manufacturer : Franklin Technology Inc.
906 JEI Platz, 186, Gasan digital 1-ro, Gumcheon-Gu,
Seoul, South Korea, 08502
Standard : FCC Part 96.47

The product was received on Mar. 18, 2022, and testing was started from Apr. 01, 2022 and completed on Apr. 02, 2022. We, Sporton International Inc. Hsinchu Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in FCC Part 96.47, and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. Hsinchu Laboratory, the test report shall not be reproduced except in full.



Approved by: Sam Chen

Sporton International Inc. Hsinchu Laboratory
No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)



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Photographs of EUT v01		



History of this test report

Report No.	Version	Description	Issued Date
FG222221AA	01	Initial issue of report	Jul. 04, 2022



Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3	96.47	End User Device additional requirement	PASS	-

Declaration of Conformity:

1. The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers. It's means measurement values may risk exceeding the limit of regulation standards, if measurement uncertainty is include in test results.
2. The measurement uncertainty please refer to report "Measurement Uncertainty".

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: Sam Chen

Report Producer: Vicky Huang



1 General Description

1.1 Product Feature of Equipment Under Test

EUT Type	EUD
Power Type	Form power adapter or battery
EUT supports Radios application	WLAN: 2.4GHz/5GHz WWAN: WCDMA, LTE, 5G NR



1.2 Antenna Information

For WWAN Function

Ant.	Brand	Model Name	Antenna Type	Connector	TX/RX Function	Gain (dBi)
1	Partron	APCMA1CG770	PCB Antenna	I-PEX	TX/RX	Note1
2	Partron	APCMA2CG770	PCB Antenna	I-PEX	RX	
3	Partron	APCMA3CG770	PCB Antenna	I-PEX	RX	
4	Partron	APCMA4CG770	PCB Antenna	I-PEX	TX/RX	
5	Partron	APCSB1CG770	PCB Antenna	I-PEX	RX	
6	Partron	APCSB2CG770	PCB Antenna	I-PEX	RX	

Note1:

Band	Uplink(UL) Frequency Range (MHz)	Downlink(DL) Frequency Range (MHz)	Ant. 1 Gain (dBi)	Ant. 2 Gain (dBi)	Ant. 3 Gain (dBi)	Ant. 4 Gain (dBi)	Ant. 5 Gain (dBi)	Ant. 6 Gain (dBi)
WCDMA Band 2	1850-1910	1930-1990	-4.68	-	-5.07	-	-	-
WCDMA Band 4	1710-1755	2110-2155	-2.09	-	-2.33	-	-	-
WCDMA Band 5	824-849	869-894	-2.51	-	-2.49	-	-	-
LTE Band 4	1710-1755	2110-2155	-2.09	-2.22	-2.33	-2.78	-	-
LTE Band 5	824-849	869-894	-2.51	-	-2.49	-	-	-
LTE Band 12	699-716	729-746	-	-3.94	-	-3.22	-	-
LTE Band 41	2496-2690		-2.77	-3.41	-3.33	-2.94	-	-
LTE Band 48 and 5G NR n48	3550-3700		-3.99	-4.44	-5.16	-4.55	-	-
LTE Band 66 and 5G NR n66	1710-1780	2110-2200	-2.09	-2.22	-2.33	-2.78	-	-

Note2: The above information was declared by manufacturer.

Note3:

For 1TX/2RX (WCDMA Band 2, 4 and 5 / 4G Band 5):

Only Ant. 1 can be used as transmitting functions.

Ant. 1 and Ant. 3 could receive simultaneously.

For 1TX/2RX (4G Band 12):

Only Ant. 4 can be used as transmitting functions.

Ant. 2 and Ant. 4 could receive simultaneously

For 1TX/4RX (4G Band 41 and 48 / 5G Band n48,n66):

Only Ant. 1 can be used as transmitting functions.

Ant. 1, 2, 3 and Ant. 4 could receive simultaneously.

For 1TX/4RX (4G Band 4, 66):

The EUT supports the Ant. 1 and Ant. 4 with TX diversity function.

At once time there is only one antenna port can transmitting RF signal

Ant. 1, 2, 3 and Ant. 4 could receive simultaneously.



For WLAN Function

Ant.	Port	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
7	1	Partron	APCBWCG770	PCB Antenna	I-PEX	Note1
8	2	Partron	APCBWCG770	PCB Antenna	I-PEX	

Note1:

Band	Ant. 7 Gain (dBi)	Ant. 8 Gain (dBi)
WLAN-2.4GHz	-2.2	-4.08
WLAN-5GHz	-4.28	-3.0

Note2: The above information was declared by manufacturer.

Note3:

For 2.4GHz function:

For IEEE 802.11b/g/n/ax mode (2TX/2RX):

Port 1 and Port 2 can be used as transmitting/receiving antenna.

Port 1 and Port 2 could transmit/receive simultaneously.

For 5GHz function:

For IEEE 802.11n/ac/ax mode (2TX/2RX):

Port 1 and Port 2 can be used as transmitting/receiving antenna.

Port 1 and Port 2 could transmit/receive simultaneously.

Note4: Directional gain information

Type	Maximum Output Power	Power Spectral Density
Non-BF	Directional gain = Max.gain + array gain. For power measurements on IEEE 802.11 devices Array Gain = 0 dB (i.e., no array gain) for N ANT ≤ 4	$Directional\ Gain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$

Ex.

Directional Gain (NSS1) formula :

$$Directional\ Gain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$$

$$NSS1(g1,1) = 10^{G1/20} ; NSS1(g1,2) = 10^{G2/20} ; NSS1(g1,2) = 10^{G3/20} ; NSS1(g1,2) = 10^{G4/20}$$

$$g_{j,k} = (NSS1(g1,1) + NSS1(g1,2) + NSS1(g1,3) + NSS1(g1,4))^2$$

$$DG = 10 \log [(NSS1(g1,1) + NSS1(g1,2) + NSS1(g1,3) + NSS1(g1,4))^2 / N_{ANT}] \Rightarrow 10$$

$$\log [(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / N_{ANT}]$$

Where ;

$$2.4G = G1 = -2.2 ; G2 = -4.08$$

$$5G = G1 = -4.28 ; G2 = -3$$

$$2.4G\ DG = -0.08\ dBi$$

$$5\ GHz\ U-NII-1\ DG = -0.61\ dBi$$

$$5\ GHz\ U-NII-3\ DG = -0.61\ dBi$$



1.3 Accessories

Accessories			
Equipment Name	Brand Name	Model Name	Rating
Adapter	Franklin	APS-M024120200W-G	INPUT: 100-240V~50-60Hz, 0.6A Max. OUTPUT: 12V, 2.0A
Lithium Ion Polymer(LIP) battery	AE- Tech.	941-A05053-011	3.8V, 15.01Wh, 3950m4Ah

1.4 Support Equipment

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
A	WLAN AP	Netgear	R7500	PY314300288
B	Switch	Panasonic	Switch-S9GPWR	N/A
C	Desktop PC (EPC)	Shuttle	XH110G	N/A
D	CBSD	Ruckus	Q410	S9GQ410US01
E	NB	DELL	E4300	N/A
F	NB	DELL	E4300	N/A

1.5 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 96.47
- FCC KDB 940660 D01 Part 96 CBRS Eqpt v02

The following reference test guidance is not within the scope of accreditation of TAF.

- WINNF-18-IN-00178_CBRS End User Device as UUT Test Guidelines V1.0

Remark: All test items were verified and recorded according to the standards and without any deviation during the test.



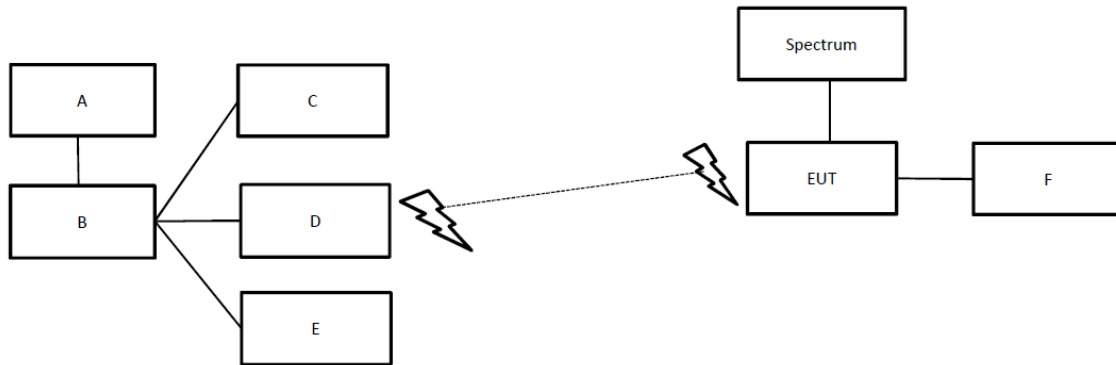
1.6 Testing Location

Testing Location Information	
Test Lab. : Sporton International Inc. Hsinchu Laboratory	
Hsinchu	ADD: No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)
(TAF: 3787)	TEL: 886-3-656-9065 FAX: 886-3-656-9085
Test site Designation No. TW3787 with FCC.	
Conformity Assessment Body Identifier (CABID) TW3787 with ISED.	

Test Condition	Test Site No.	Test Engineer	Test Environment (°C / %)	Test Date
RF Conducted	TH01-CB	Jeff Wu	23.2-23.7 / 63-65	Apr. 01, 2022~ Apr. 02, 2022

2 Test Configuration of Equipment Under Test

2.1 Connection Diagram of Test System



Item	Connection	Shielded	Length
1	RJ-45 cable	No	1.5m
2	RJ-45 cable	No	1.5m
3	RJ-45 cable	No	1.5m
4	RJ-45 cable	No	1.5m



3 End User Device additional requirement

3.1 Test Requirement

FCC Part 96.47

(a) End User Devices may operate only if they can positively receive and decode an authorization signal transmitted by a CBSD, including the frequencies and power limits for their operation.

(1) An End User Device must discontinue operations, change frequencies, or change its operational power level within 10 seconds of receiving instructions from its associated CBSD.

3.2 Test Procedure

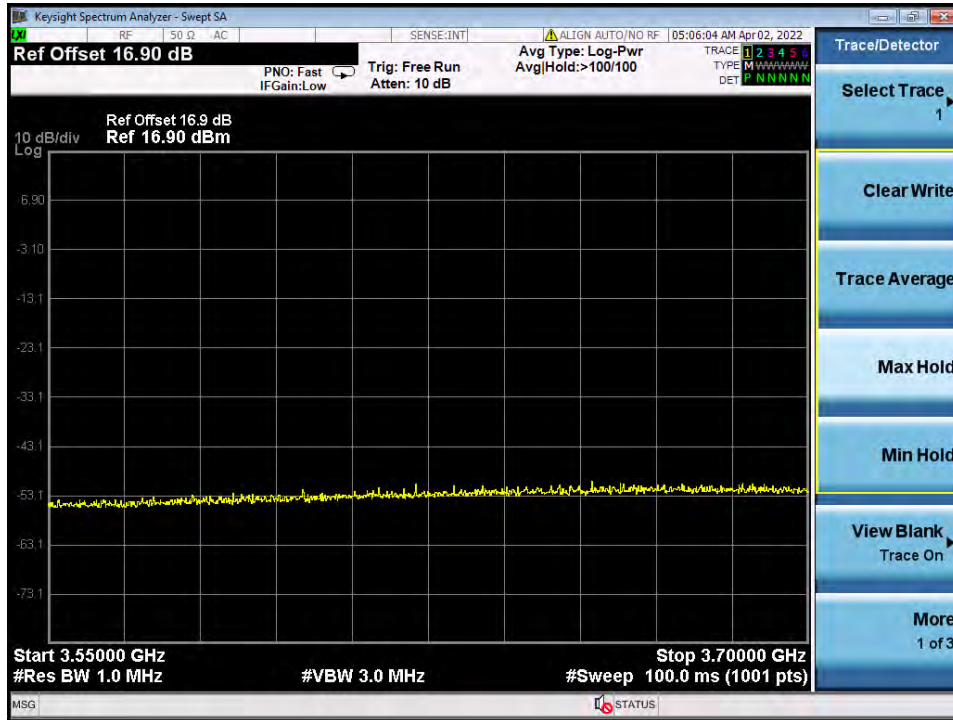
Following procedure can be done by applying WINNF-18-IN-00178_CBRS End User Device as UUT Test Guidelines V1.0, use the certified CBSD as companion device to show compliance with Part 96.47 requirement for End User Device (EUD):

1. Initial Power ON EUT for 300 seconds and check EUT does not transmit in CBRS band.
2. Reboot EUT for 300 seconds.
3. Set CBSD operation in 3600-3620MHz and power level 0dBm/MHz.)
4. Check EUT initial RF transmit time in CBRS band
5. Check EUT Tx frequency.
6. Check EUT Tx power level.
7. Disable CBSD service and check EUT stops transmission within 10 seconds.
8. Set CBSD operation in 3650-3660MHz and power level 37dBm/MHz.
9. Check EUT Tx frequency.
10. Check EUT Tx power level.



3.3 Test Result

[Step 1] Intial Power ON EUT for 300 seconds and check EUT does not transmit in CBRS band.

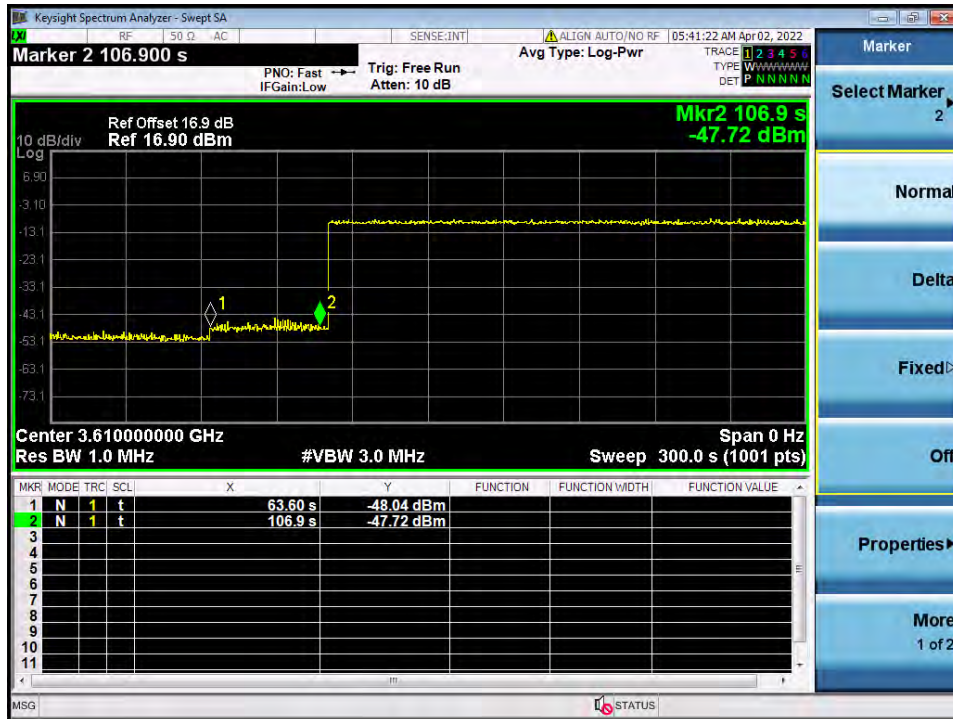




[Step 2] Reboot EUT for 300 seconds.

[Step 3] Set CBSD operation in 3600-3620MHz and power level 0dBm/MHz.

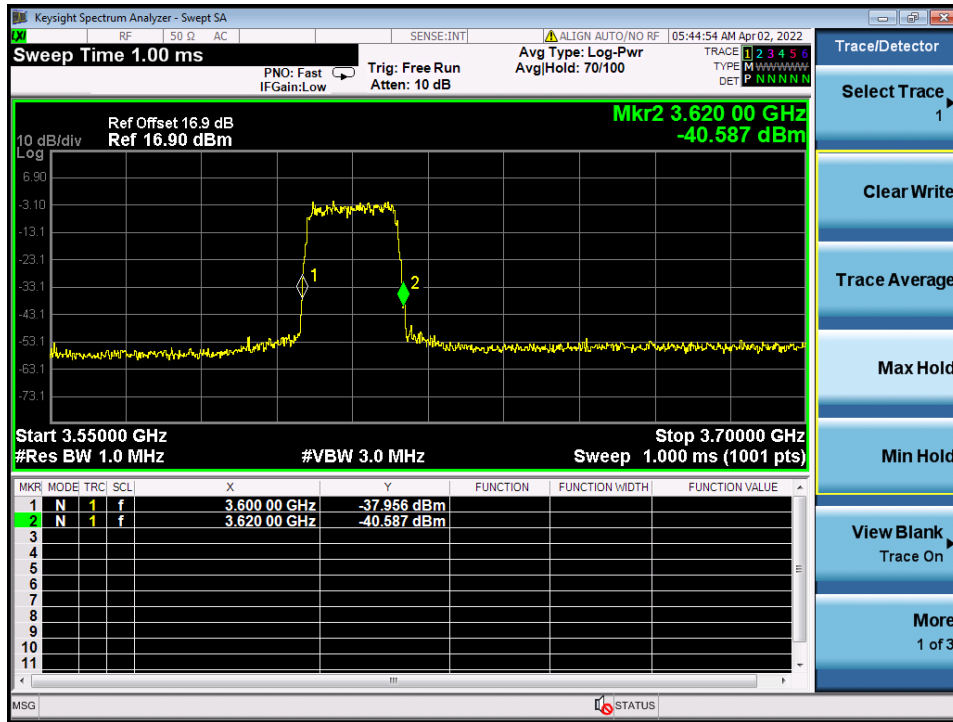
[Step 4] Check EUT initial RF transmit time in CBRS band.



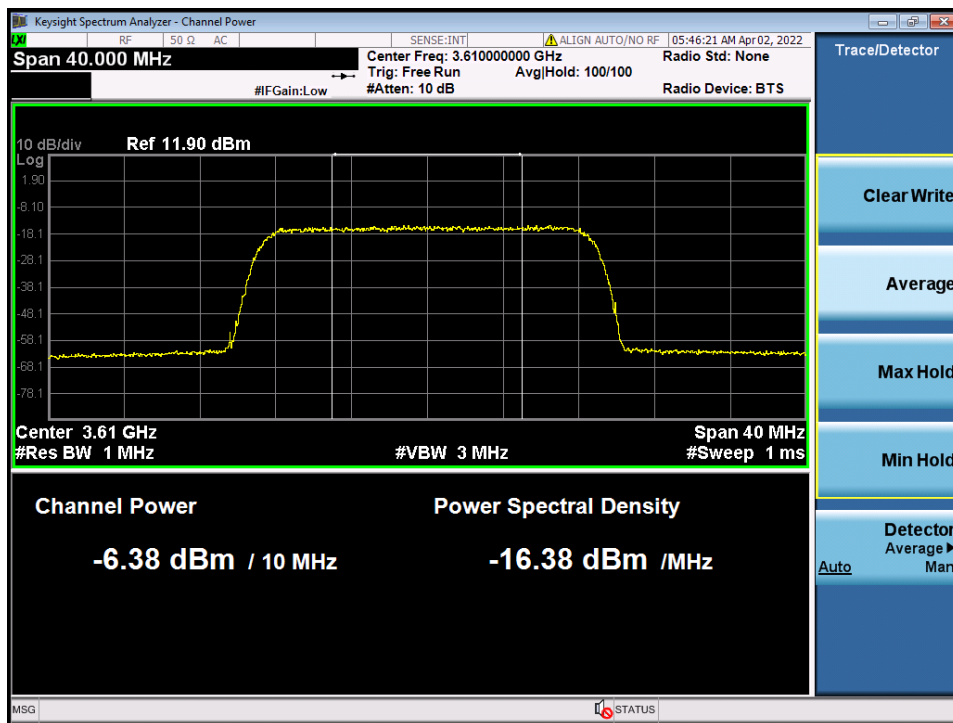
Note:
 Marker 1: CBSD starts RF operation in CBRS band.
 Marker 2: EUT starts RF operation in CBRS band.



[Step 5] Check EUT Tx frequency.



[Step 6] Check EUT Tx power level

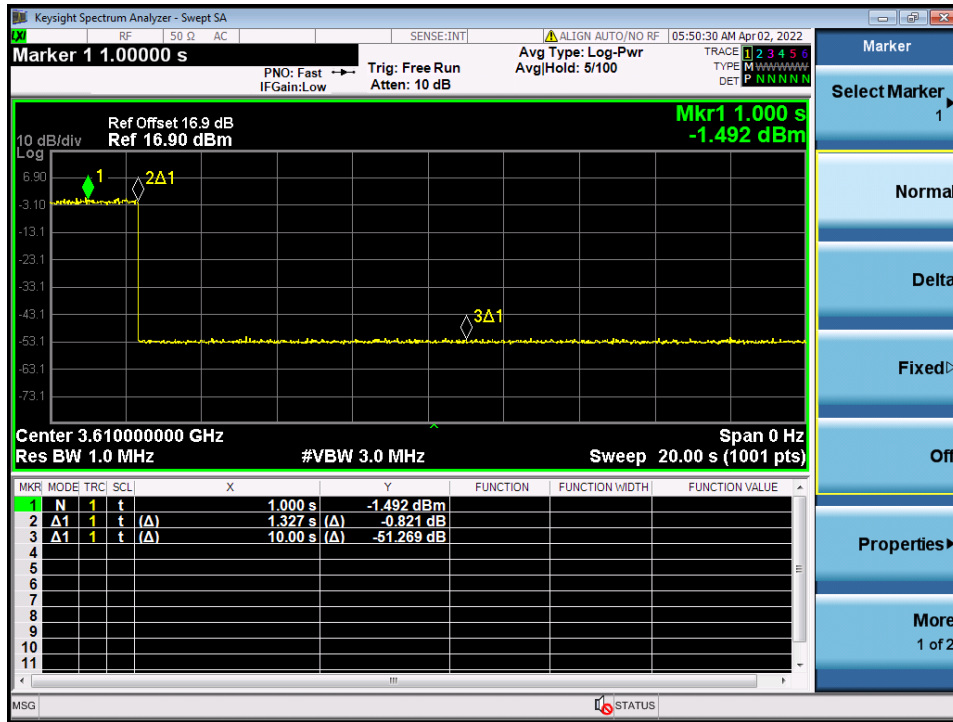




Step	Freq. (MHz)	Bandwidth (MHz)	Antenna Gain (dBi)	Ant. 1 (dBm/MHz)	maxEirp (dBm/MHz)	Result
6	3610	20	-3.99	-6.38	-10.37	PASS



[Step 7] Disable CBSD service and check EUT stops transmission within 10 seconds.



Note:

Marker 1: Trigger CBSD disable RF service.

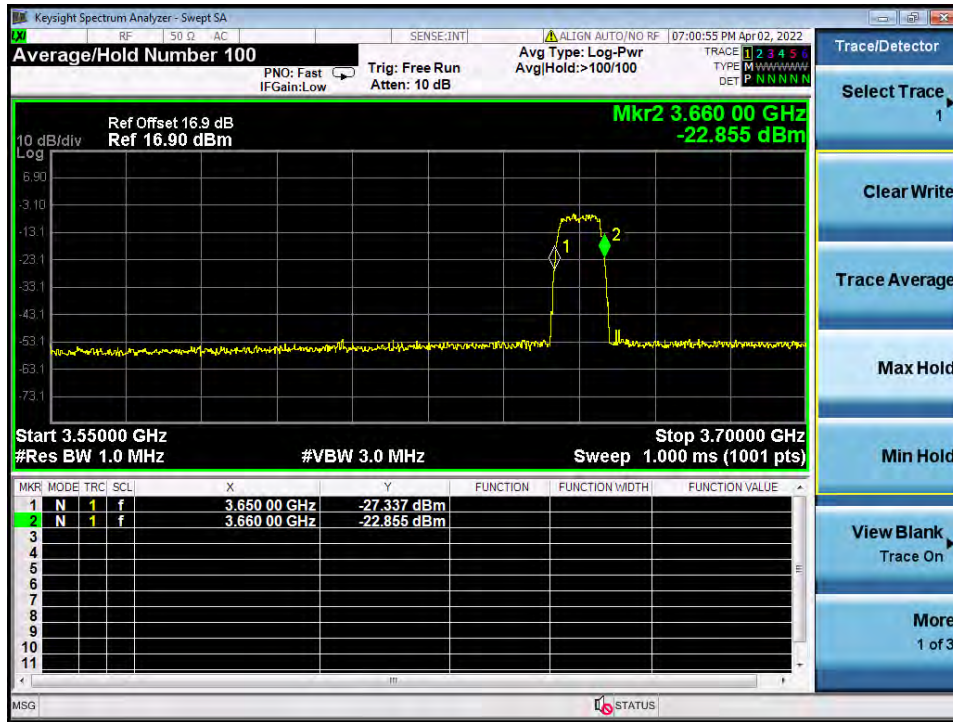
Marker 2: EUT stops RF operation in CBRS band.

Marker 3: 10 seconds time limit for EUD to disable operation in this channel.

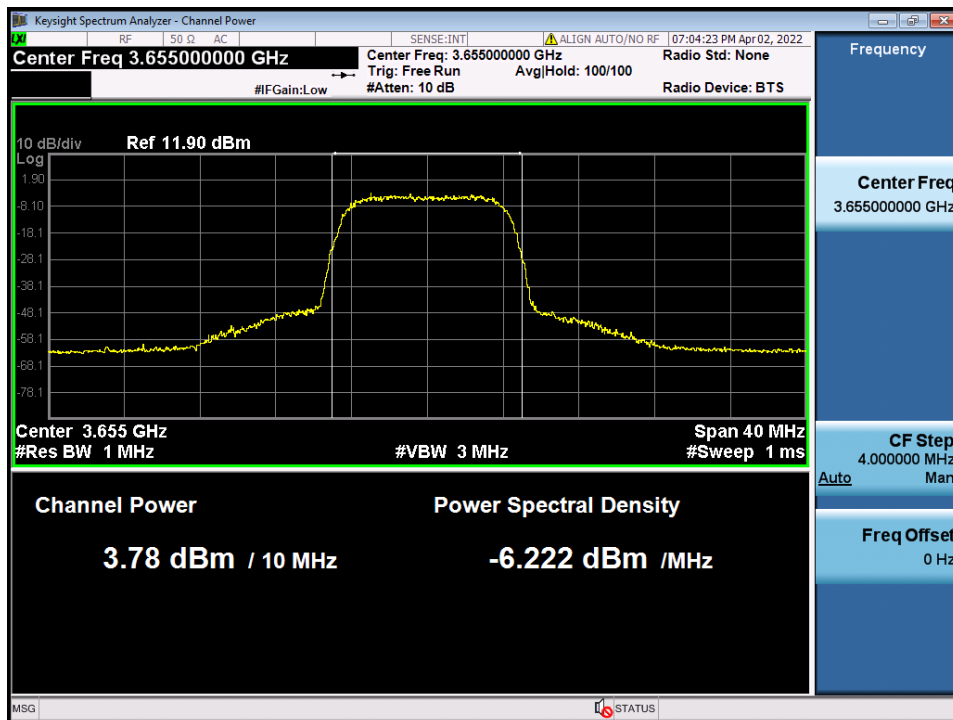


[Step 8] Set CBSD operation in 3650-3660MHz and power level 37dBm/MHz.

[Step 9] Check EUT Tx frequency.



[Step 10] Check EUT Tx power level





Step	Freq. (MHz)	Bandwidth (MHz)	Antenna Gain (dBi)	Ant. 1 (dBm/MHz)	maxEirp (dBm/MHz)	Result
10	3655	10	-3.99	3.78	-0.21	PASS



4 Test Equipment and Calibration Data

Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	May 21, 2021	May 20, 2022	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-06	1 GHz~26.5 GHz	Oct. 04, 2021	Oct. 03, 2022	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-07	1 GHz~26.5 GHz	Oct. 04, 2021	Oct. 03, 2022	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-08	1 GHz~26.5 GHz	Oct. 04, 2021	Oct. 03, 2022	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-09	1 GHz~26.5 GHz	Oct. 04, 2021	Oct. 03, 2022	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz~26.5 GHz	Oct. 04, 2021	Oct. 03, 2022	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-30	1 GHz~26.5 GHz	Oct. 04, 2021	Oct. 03, 2022	Conducted (TH01-CB)
Cable	Woken	RG402	low Cable-30	9 kHz~1 GHz	Mar. 04, 2022	Mar. 03, 2023	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	SWI-01-P1	1 GHz~26.5 GHz	Dec. 13, 2021	Dec. 12, 2022	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	SWI-01-P2	1 GHz~26.5 GHz	Dec. 13, 2021	Dec. 12, 2022	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	SWI-01-P3	1 GHz~26.5 GHz	Dec. 13, 2021	Dec. 12, 2022	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	SWI-01-P4	1 GHz~26.5 GHz	Dec. 13, 2021	Dec. 12, 2022	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	SWI-01-P5	1 GHz~26.5 GHz	Dec. 13, 2021	Dec. 12, 2022	Conducted (TH01-CB)
RF Power Divider	Woken	4 Way	TH01-DV-01	1GHz~6GHz	Oct. 04, 2021	Oct. 03, 2022	Conducted (TH01-CB)
RF Power Divider	STI	2 Way	DV-2way-01	1GHz~8GHz	Oct. 04, 2021	Oct. 03, 2022	Conducted (TH01-CB)

Note: Calibration Interval of instruments listed above is one year.



5 Measurement Uncertainty

Test Items	Uncertainty	Remark
Conducted Emission	2.5 dB	Confidence levels of 95%