



TEST REPORT

REPORT NUMBER: 25B02W000010-007

ON

Type of Equipment: Handheld Wireless Terminal

Type of Designation: T8F1C

Brand Name: SUNMI

Manufacturer: Shanghai Sunmi Technology Co.,Ltd.

FCC ID: 2AH25T8F1C

IC: 22621-T8F1C

ACCORDING TO

FCC Part 15E, FCC Part 2, ANSI C63.10-2013, RSS-Gen Issue 5, RSS-247 Issue3

Chongqing Academy of Information and Communications Technology

Month date, year

August 14, 2025

Signature



Zhou Jin

Director

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of Chongqing Academy of Information and Communications Technology.



Report No.: 25B02W000010-007

Revision Version

Report Number	Revision	Date
25B02W000010-007	00	2025-08-14

Chongqing Academy of Information and Communications Technology

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1. Test Laboratory

1.1. Testing Location

Name:	Chongqing Academy of Information and Communications Technology
Designation Number:	CN1239
IC Registration Number:	29397
Address:	No.19 EastRoad,Xiantao Big-data Valley,Yubei District,Chongqing,People's Republic of China
Postal Code:	401336
Telephone:	0086-23-88069965
Fax:	0086-23-88608777

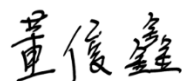
1.2. Testing Environment

Normal Temperature:	15-35°C
Relative Humidity:	30-60%RH

1.3. Project data

Testing Start Date:	2025-06-03
Testing End Date:	2025-06-21

1.4. Signature



2025-08-14

Dong Junxin
(Prepared this test report)

Date



2025-08-14

Wang Lili
(Reviewed this test report)

Date



2025-08-14

Zhou Jin
Director of the laboratory
(Approved this test report)

Date

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2. Client Information

2.1. Applicant Information

Company Name:	Shanghai Sunmi Technology Co.,Ltd.
Address /Post:	Room 505,No.388,Song Hu Road,Yang Pu District,Shanghai,China
City:	Shanghai
Country:	China
Telephone:	8618501703215
Fax:	N/A
Email:	fang.lu@sunmi.com
Contact Person:	Fang Lu

2.2. Manufacturer Information

Company Name:	Shanghai Sunmi Technology Co.,Ltd.
Address /Post:	Room 505,No.388,Song Hu Road,Yang Pu District,Shanghai,China
City:	Shanghai
Country:	China
Telephone:	8618501703215
Fax:	N/A
Email:	fang.lu@sunmi.com
Contact Person:	Fang Lu

3. Equipment under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

EUT Description	Handheld Wireless Terminal
Model name	T8F1C
Brand name	SUNMI
WLAN Frequency Band	Wi-Fi 5G U-NII-1/ U-NII-2a/U-NII-2c/U-NII-3:802.11a/n/ac
Type of WLAN modulation	OFDM
Extreme Temperature	-20/+55°C
Nominal Test Voltage	3.87V
Extreme Test High Voltage	4.45V
Extreme Test Low Voltage	3.6V

Note1: Photographs of EUT are shown in ANNEX A of this test report.

Note2: High and low voltage values in extreme condition test are given by manufacturer.

Note3: The Extreme Temperature is provided by the manufacturer and has not been verified by the laboratory.

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
25B02W000010#S1	IMEI:862072070057563;862072070057571	V00	4.0.0	2025-05-23
25B02W000010#S4	IMEI:862072070057688;862072070057696	V00	4.0.0	2025-05-23

*EUT ID: is used to identify the test sample in the lab internally.

No.	Item(s)	Data
1	Antenna gain of EUT	U-NII-1: 2.51 dBi U-NII-2A: 2.55 dBi U-NII-2C: 1.94 dBi
Note: The data of antenna gain is provided by the Antenna specification may affect the validity of the test results in this report, and the impact and consequences of this shall be undertaken by the customer.		

3.3. Outline of Equipment under Test

Technology	Band	UL Freq.(MHz)	DL Freq.(MHz)
WLAN	5G	UNII 1: 5150MHz-5250MHz UNII 2A: 5250MHz-5350MHz UNII 2C: 5470MHz-5725MHz	

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Test frequency list:
UNII-1 and UNII-2A:

BW_20M	Channel	36	40	44	48	52	56	60	64
	Freq. (MHz)	5180	5200	5220	5240	5260	5280	5300	5320
BW_40M	Channel	38		46		54		62	
	Freq. (MHz)	5190		5230		5270		5310	
BW_80M	Channel	42				58			
	Freq. (MHz)	5210				5290			

UNII-2C:

BW_20M	Channel	100	104	108	112	116	120	124	128	132	136	140
	Freq. (MHz)	5500	5520	5540	5560	5580	5600	5620	5640	5660	5680	5700
BW_40M	Channel	102		110		118		126		134		/
	Freq. (MHz)	5510		5550		5590		5630		5670		/
BW_80M	Channel	106				122				/		
	Freq. (MHz)	5530				5610				/		

Note: "/" Represents empty

3.4. Internal Identification of AE used during the test

AE ID*	Description	Note	dB*
C1	USB Cable	SSM-A033A	--
A1	Adapter	TPA-141A050200UU01	--
A2	Adapter	UC13US	--
A3	Adapter	TPA-10120150UU	--
B1	Battery	GYPA	--
AE1	RF cable	--	1.0

AE ID*: is used to identify the test sample in the lab internally.

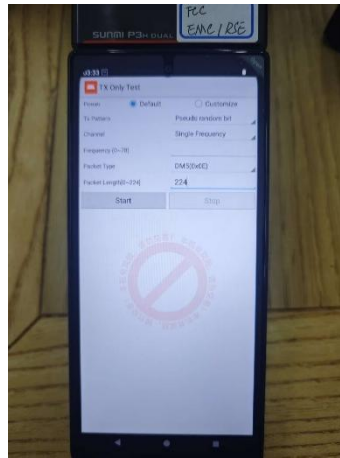
dB*: is provided customer.

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3.5. EUT Test RF Configuration

EUT uses engineering mode to control RF emissions, changing power levels, channels, rates, and HT.



4. Reference Documents

4.1. Documents supplied by applicant

PICS/PIXIT, referring to Annex B for detailed information, is supplied by the client or manufacturer, which is the basis of testing.

4.2. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part 15E	FCC CFR 47, Part 15, Subpart E: Unlicensed National InformSation Infrastructure Devices	--
FCC Part 2	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations	--
ANSI C63.10	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices	2013
KDB 789033 D02	Information Infrastructure (U-NII) Devices - Part 15, Subpart E	v02r01
RSS-Gen Issue 5	General Requirements for Compliance of Radio Apparatus	2021
RSS-247 Issue 3	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices	2023
Note: FCC Part 2 and KDB 789033 D02 is not A2LA certified.		

5. Test Equipments Utilized

5.1. RF Test System

No.	Equipment	Model	SN	HW Version	SW Version	Manufacturer	Cal. Interval	Cal.Due Date
1	Spectrum analyzer	FSQ 26	201137	--	--	R&S	1 Year	2026-06-15

5.2. RSE Test System

No.	Equipment	Model	SN	HW Version	SW Version	Manufacturer	Cal. Interval	Cal.Due Date
1	EMI Test Receiver	ESU40	100307	--	--	R&S	1 Year	2025-06-28
2	TRILOG Broadband Antenna	VULB9163	9163-586	--	--	Schwarzbeck	2 Years	2026-10-28
3	Horn antenna	9120D	1083	--	--	Schwarzbeck	2 Years	2026-11-08
4	Horn antenna	DATE 1152	LM7127	--	--	ETS	2 Years	2026-09-30
5	Horn antenna	DATE 1012	LM5945	--	--	ETS	2 Years	2026-09-30
6	Loop Antenna	6502	00143163	--	--	ETS	2 Year	2026-09-04
7	Amplifier1	SCU-08F1	8320027	--	--	R&S	--	--
8	Amplifier2	SCU-18F	180093	--	--	R&S	--	--
9	2-Line V-Network	ENV216	102368	--	--	R&S	1 Year	2026-05-23
10	Test Receiver	ESR 3	101382	03	3.48 SP2	R&S	1 Year	2025-06-28
11	Test Receiver	ESW 26	101382	00	1.50 SP1	R&S	1 Year	2025-06-28

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5.3. Climate Chamber

No.	Name	Type	SN	Manufacture	Cal. Interval	Cal.Due Date
--	--	--	--	--	--	--

5.4. Anechoic chamber Vibration table

No.	Name	Type	SN	Manufacture	Cal. Interval	Cal.Due Date
1	Fully-Anechoic Chamber	FAC5	--	TDK	3Years	2027-11-04
2	Anechoic Chamber	SAC 10	--	TDK	3Years	2027-11-05

5.5. Test software

No.	Name	version	SN	Manufacture
1	EMC32 (Transmitter Spurious Emission-Radiated Above 1GHz)	V9.26.01	--	R&S
2	EMC32 (Transmitter Spurious Emission-Radiated Below 1GHz)	V 10.20.01	--	R&S
3	EMC32 (AC Powerline Conducted Emission)	V 10.40.10	--	R&S
4	WIFI/BT CE/FCC/ICautomated testing software	V1.0.0.0	--	Beijing Zhiwang Xince Technology Co., Ltd

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6. Test Results

6.1 Summary of Test Results

A brief summary of the tests carried out is shown as following.

FCC Rules	IC Rules	Name of Test	Result
KDB 789033 D02		Duty Cycle	Pass ^{Note6}
15.407(a)	RSS-247 6.2	Maximum Output Power	Pass ^{Note6}
15.407(a)	RSS-247 6.2	Power Spectral Density	Pass ^{Note4}
2.1049	RSS-GEN 6.7	99% Occupied Bandwidth	Pass ^{Note6}
2.1049	RSS-GEN 6.7	Occupied 26dB Bandwidth	Pass ^{Note6}
15.209 & 15.407(b)	RSS-Gen 8.9, RSS-247 6.2	Band edge compliance	Pass
15.209 & 15.407(b)	RSS-Gen 8.9, RSS-247 6.2	Transmitter spurious emissions radiated	Pass
15.407(g)	RSS-247 6.2	Frequency Stability	N/A
15.407(h)	RSS-Gen 8.8	Transmit Power Control	N/A ^{Note3}
15.407(h) (2)	RSS-247 6.3	Non-Occupancy Period	Pass ^{Note5}
15.407(h) (2)	RSS-247 6.3	Channel Closing Transmission Time	Pass ^{Note5}
15.407(h) (2)	RSS-247 6.3	Channel Move Time	Pass ^{Note5}
15.207	RSS Gen 6.8	AC Powerline Conducted Emission	Pass
15.203	RSS-247 6.2	Antenna requirement	Pass ^{Note2}

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NOTE 1:

The T8F1C, manufactured by Shanghai Sunmi Technology Co.,Ltd. is a variant product for testing. This project is a variant project based on the original report 24T04I300217-065-V1 and 24T04I300217-067 issued by 3in with below changes:

- Added RFID function.
- Modified 2/3/4G Div Antenna and WIFI Antenna. Remove 1 NFC, Add RFID Antenna.
- PCB Changes,
- Removed: 8 Pin in behind.
- Mechanical shell changes.

Type of Service	Model Name	Super capacitor	pogopin	NFC	RFID
Original	T8F1B	Yes	8 Pin in behind & 6 pin in bottom	Two-sided	No
Variant	T8F1C	No	6 Pin in bottom	Under screen	Yes

According to the Product Change Description, we tested radiated spurious emission and the worst mode of Output Power in the original report, and the test data was recorded in the report.

NOTE 2:

5G RLAN used an Internal antenna with max Gain 2.51/2.55/1.94 dBi that complied with 15.203 Requirements.

NOTE 3:

A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW.

NOTE 4:

The test verdict of this item come from the original report(24T04I300217-065-V1).

NOTE 5:

The test verdict of this item come from the original report(24T04I300217-067).

NOTE 6:

The test data in this report is validation data for the worst mode.

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6.2 Duty Cycle

Specifications:	KDB 789033 D02
DUT Serial Number:	IMEI:862072070057563;862072070057571
Test conditions:	Ambient Temperature:15°C-35°C Relative Humidity:30%-60%RH Air pressure: 86-106kPa
Test Results:	--

Measurement Uncertainty:

Measurement Uncertainty	--
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Test Procedure:

The measurement method is made according to KDB 789033 B

Measurements of duty cycle and transmission duration shall be performed using one of the following techniques:

- a) A diode detector and an oscilloscope that together have sufficiently short response time to permit accurate measurements of the on and off times of the transmitted signal.
- b) The zero-span mode on a spectrum analyzer or EMI receiver, if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal. Set the center frequency of the instrument to the center frequency of the transmission, Set $RBW > EBW$ if possible; otherwise, set RBW to the largest available value. Set $VBW > RBW$. Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are $> 50/T$, where T is defined in II.B.1.a), and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if $T < 16.7$ microseconds.)

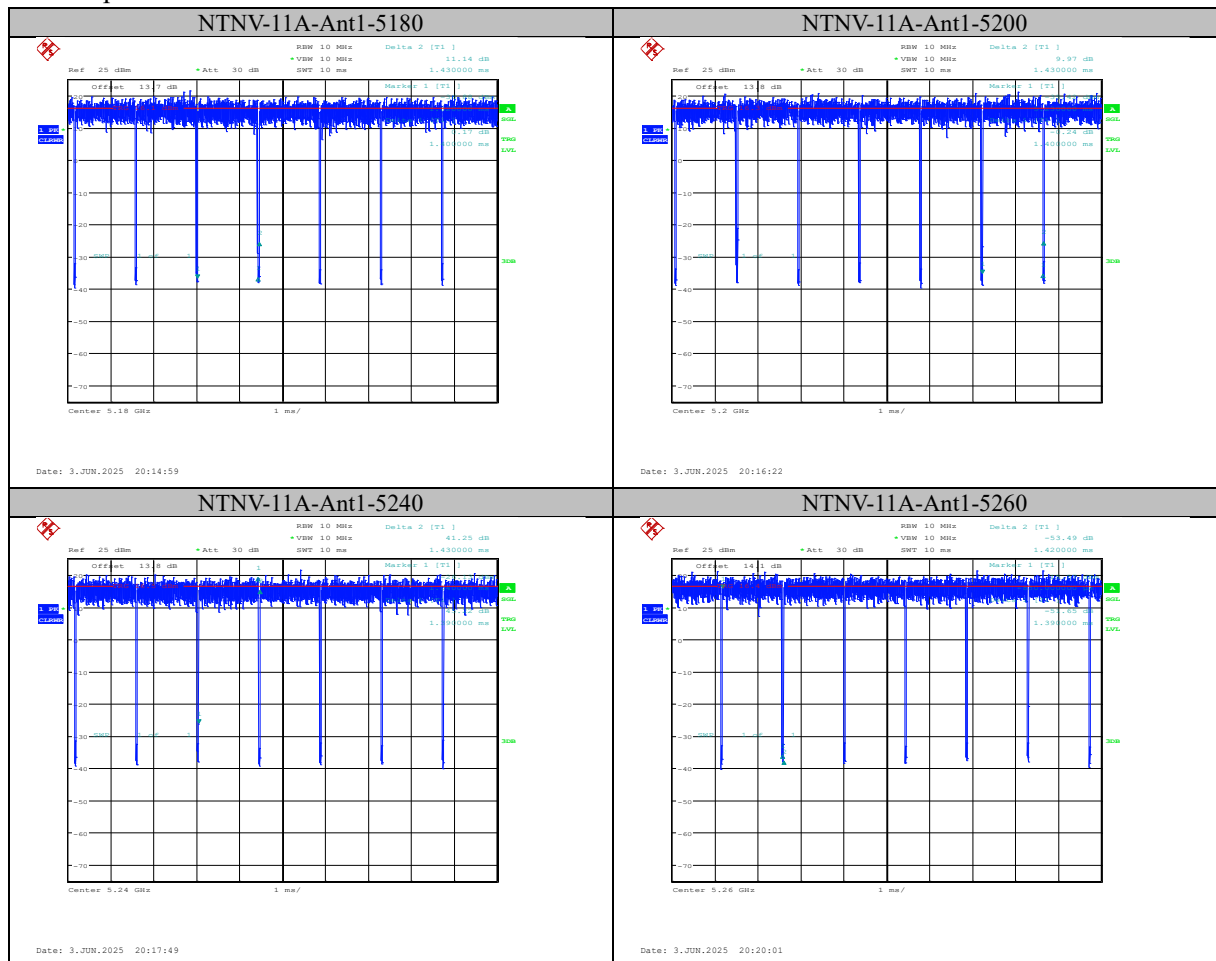
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Measurement Results:

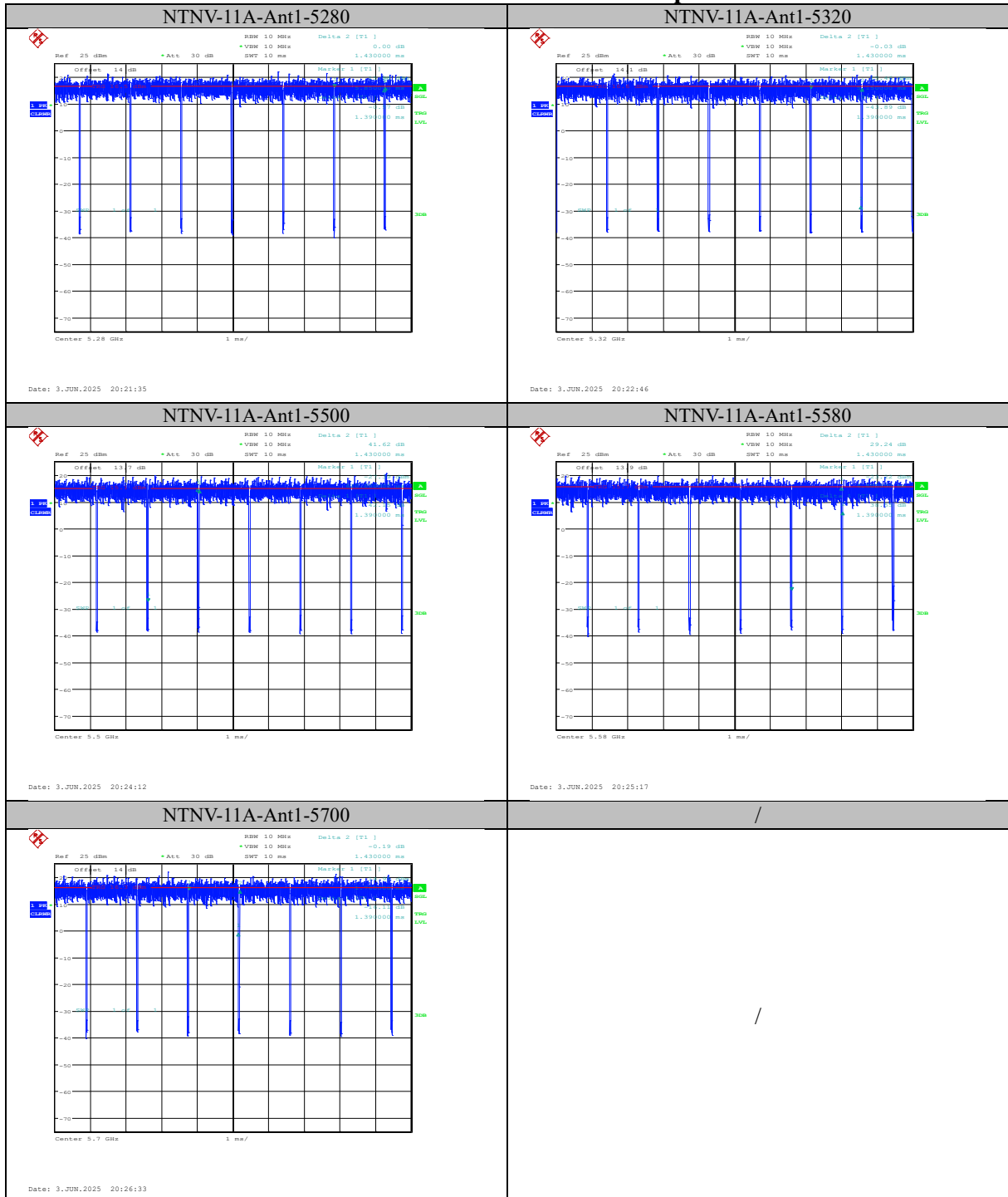
TestMode	Antenna	Frequency[MHz]	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]
11A	Ant1	5180	1.40	1.43	97.90
11A	Ant1	5200	1.40	1.43	97.90
11A	Ant1	5240	1.39	1.43	97.20
11A	Ant1	5260	1.39	1.42	97.89
11A	Ant1	5280	1.39	1.43	97.20
11A	Ant1	5320	1.39	1.43	97.20
11A	Ant1	5500	1.39	1.43	97.20
11A	Ant1	5580	1.39	1.43	97.20
11A	Ant1	5700	1.39	1.43	97.20

Test Graphs



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6.3 99% Occupied Bandwidth

Specifications:	2.1049,RSS-GEN 6.7
DUT Serial Number:	IMEI:862072070057563;862072070057571
Test conditions:	Ambient Temperature:15°C-35°C Relative Humidity:30%-60%RH Air pressure: 86-106kPa
Test Results:	--

Measurement Uncertainty:

Measurement Uncertainty	17.6kHz
-------------------------	---------

Test Procedure:

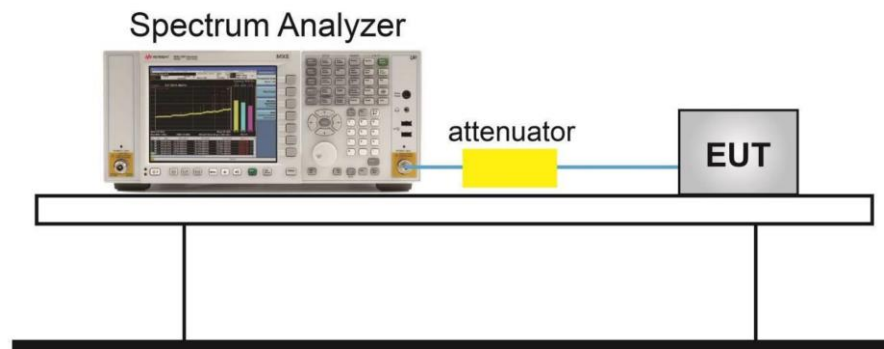
The measurement method is made according to KDB 789033 D

1. Set center frequency to the nominal EUT channel center frequency.
2. Set span = 1.5 times to 5.0 times the OBW.
3. Set RBW = 1 % to 5 % of the OBW
4. Set VBW $\geq 3 \cdot$ RBW
5. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
6. Use the 99 % power bandwidth function of the instrument (if available).
7. If the instrument does not have a 99 % power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.

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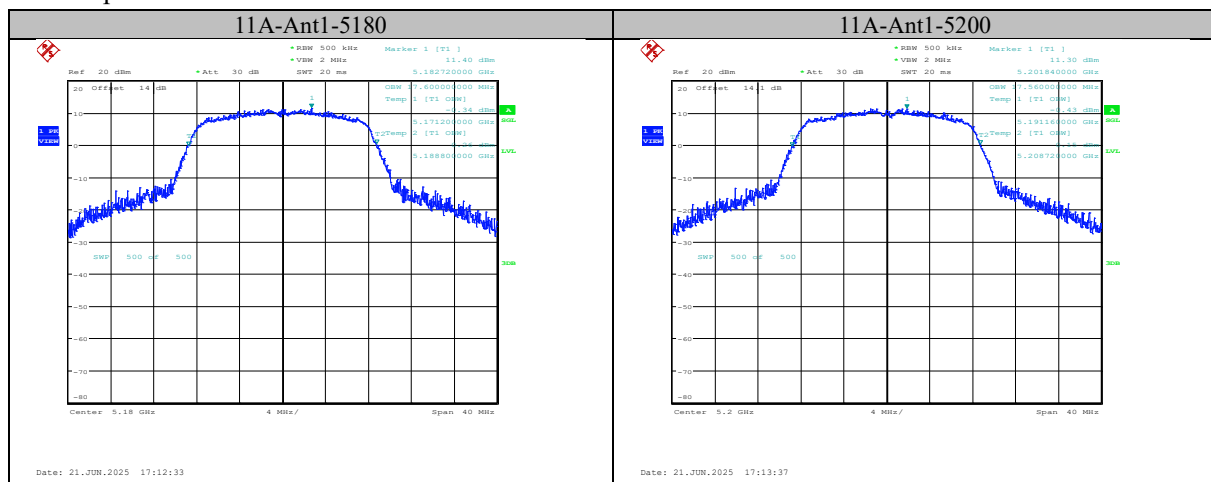
Test Setup



Measurement Results:

TestMode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5180	17.60	5171.2000	5188.8000	---	---
11A	Ant1	5200	17.56	5191.1600	5208.7200	---	---
11A	Ant1	5240	17.56	5231.2000	5248.7600	---	---
11A	Ant1	5260	17.44	5251.2800	5268.7200	---	---
11A	Ant1	5280	17.48	5271.2800	5288.7600	---	---
11A	Ant1	5320	17.40	5311.2800	5328.6800	---	---
11A	Ant1	5500	17.52	5491.2000	5508.7200	---	---
11A	Ant1	5580	17.52	5571.2400	5588.7600	---	---
11A	Ant1	5700	17.32	5691.3200	5708.6400	---	---

Test Graphs



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11A-Ant1-5240



Date: 21.JUN.2025 17:16:08

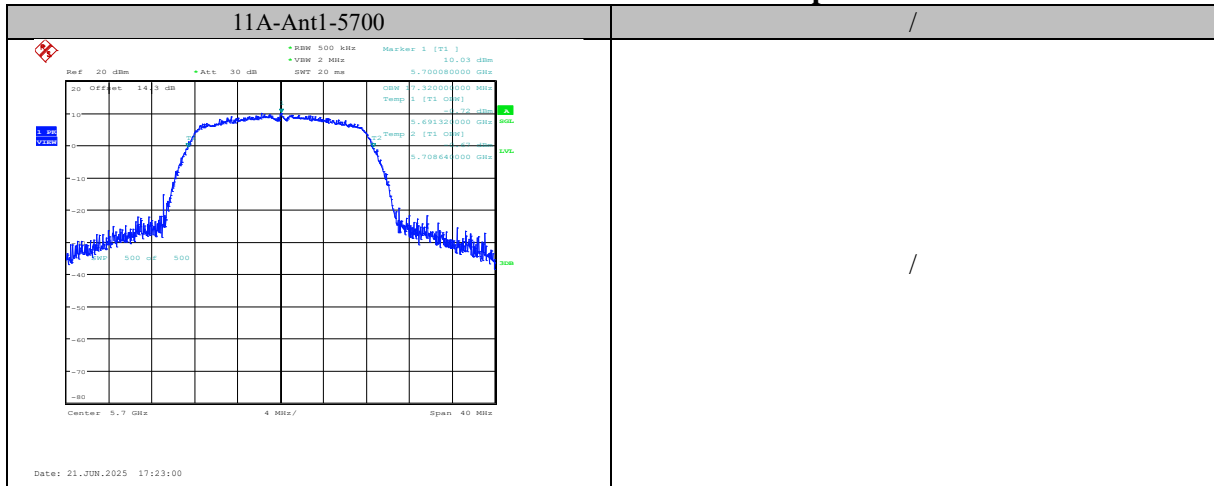
11A-Ant1-5320



11A-Ant1-5580



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6.4 Occupied 26dB Bandwidth

Specifications:	2.1049, RSS-GEN 6.7
DUT Serial Number:	IMEI:862072070057563;862072070057571
Test conditions:	Ambient Temperature:15°C-35°C Relative Humidity:30%-60%RH Air pressure: 86-106kPa
Test Results:	--

Measurement Uncertainty:

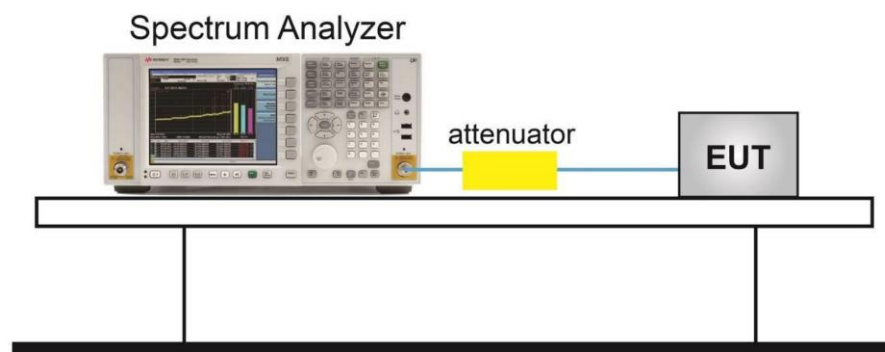
Measurement Uncertainty	17.6kHz
-------------------------	---------

Test Procedure:

The measurement method is made according to KDB 789033 C

- 1.Set RBW = approximately 1% of the emission bandwidth
 - 2.Set the VBW > RBW
 - 3.Detector = Peak.
 - 4.Trace mode = max hold.
 - 5.Measure the maximum width of the emission that is 26 dB down from the maximum of the emission.
- Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

Test Setup:



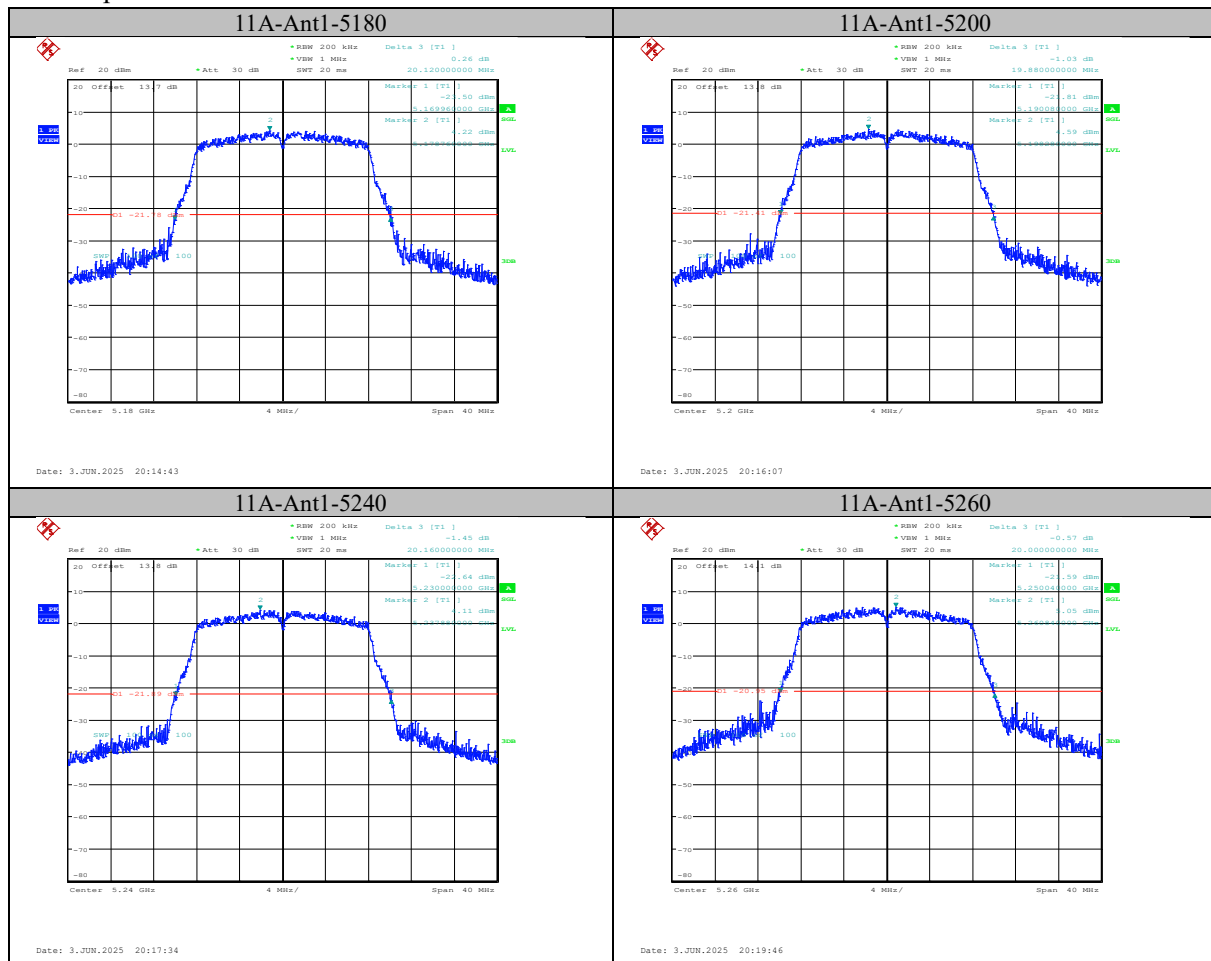
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Measurement Results:

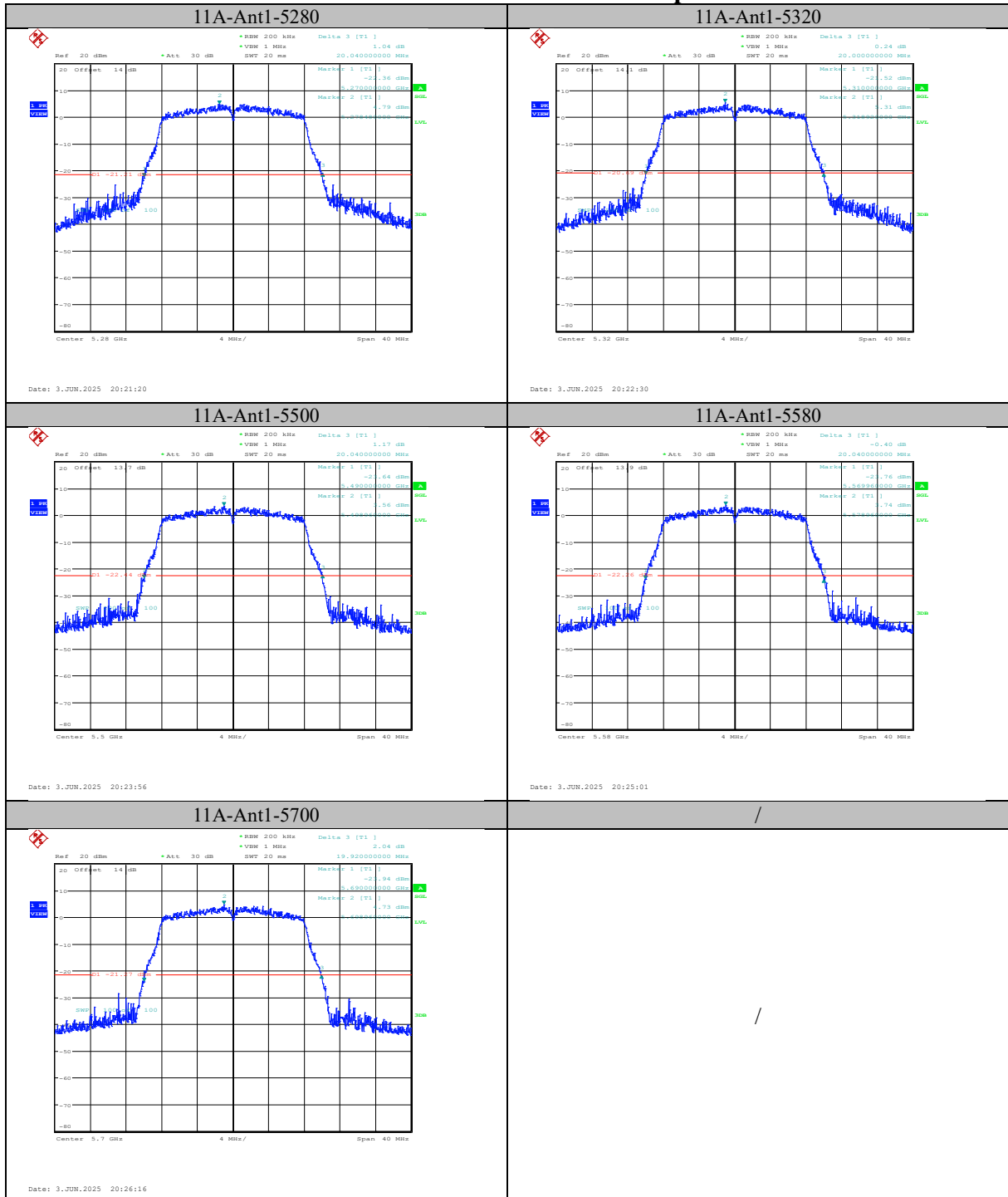
TestMode	Antenna	Frequency[MHz]	26db EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5180	20.12	5169.96	5190.08	---	---
11A	Ant1	5200	19.88	5190.08	5209.96	---	---
11A	Ant1	5240	20.16	5230.00	5250.16	---	---
11A	Ant1	5260	20.00	5250.04	5270.04	---	---
11A	Ant1	5280	20.04	5270.00	5290.04	---	---
11A	Ant1	5320	20.00	5310.00	5330.00	---	---
11A	Ant1	5500	20.04	5490.00	5510.04	---	---
11A	Ant1	5580	20.04	5569.96	5590.00	---	---
11A	Ant1	5700	19.92	5690.00	5709.92	---	---

Test Graphs



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6.5 Maximum conducted output power

Specifications:	FCC Part 15.407(a), RSS-247 6.2
DUT Serial Number:	IMEI:862072070057563;862072070057571
Test conditions:	Ambient Temperature:15°C-35°C Relative Humidity:30%-60%RH Air pressure: 86-106kPa
Test Results:	Pass

Limit Level Construction:

Standard	Limit
FCC Part 15.407(a)	For client devices in the 5.15–5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
RSS-247 6.2	5150-5250 MHz: For other devices, the maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10B, dBm, whichever power is less. B is the 99% emission bandwidth in megahertz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band. 5250-5350 MHz: The maximum conducted output power shall not exceed 250 mW or 11 + 10 log10B, dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band. The maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log10B, dBm, whichever is less. 5470-5600 MHz and 5650-5725 MHz: The maximum conducted output power shall not exceed 250 mW or 11 + 10 log10B, dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band. The maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log10B, dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum

Measurement Uncertainty:

Measurement Uncertainty	0.46dB
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Test Procedure:

The measurement method SA-2 is made according to KDB 789033 E

Method SA-2 (trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction).

1. Measure the duty cycle, x , of the transmitter output signal as described in II.B.
2. Set span to encompass the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.
3. Set RBW = 1 MHz. (iv) Set VBW $\geq$ 3 MHz.
4. Number of points in sweep $\geq 2 \times \text{span} / \text{RBW}$. (This ensures that bin-to-bin spacing is $\leq \text{RBW}/2$, so that narrowband signals are not lost between frequency bins.)
5. Sweep time = auto.
6. Detector = power averaging (rms), if available. Otherwise, use sample detector mode.
7. Do not use sweep triggering. Allow the sweep to “free run.”
8. Trace average at least 100 traces in power averaging (rms) mode; however, the number of traces to be averaged shall be increased above 100 as needed to ensure that the average accurately represents the true average over the on and off periods of the transmitter.
9. Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument’s band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.

Add $10 \log (1/x)$, where x is the duty cycle, to the measured power to compute the average power during the actual transmission times (because the measurement represents an average over both the on and off times of the transmission). For example, add $10 \log (1/0.25) = 6 \text{ dB}$ if the duty cycle is 25%

Antenna gain of EUT:

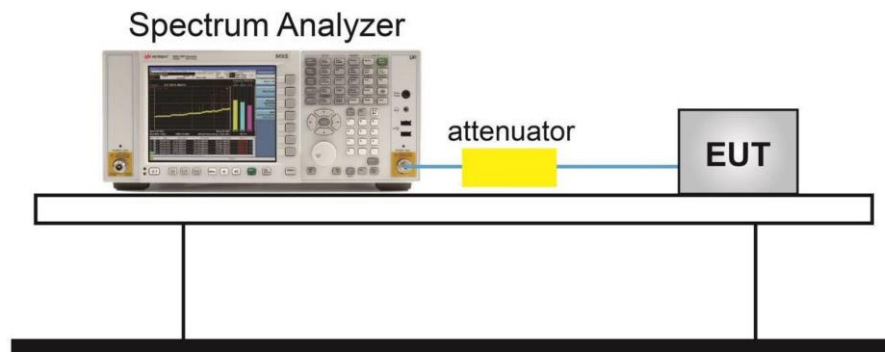
No.	Item(s)	Data
1	Antenna gain of EUT	U-NII-1: 2.51 dBi U-NII-2A: 2.55 dBi U-NII-2C: 1.94 dBi

Note: The data of antenna gain is provided by the Antenna specification may affect the validity of the test results in this report, and the impact and consequences of this shall be undertaken by the customer.

Test setup

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Measurement Results:

Test Mode	Antenna	Frequency [MHz]	Set Power	Channel Power [dBm]	Duty Cycle [%]	DC Factor [dBm]	Result [dBm]	FC CLi mt [dBm]	IC Limt [dBm]	EIRP [dBm]	EIRP Limit [dBm]	Verdict
11A	Ant1	5180	18	15.86	97.90	0.09	15.95	≤ 23.98	--	18.46	≤ 22.46	PASS
11A	Ant1	5200	18	15.78	97.90	0.09	15.87	≤ 23.98	--	18.38	≤ 23.45	PASS
11A	Ant1	5240	17.5	15.47	97.20	0.12	15.59	≤ 23.98	--	18.10	≤ 23.45	PASS
11A	Ant1	5260	18	15.76	97.89	0.09	15.85	≤ 23.98	≤ 23.42	18.40	≤ 29.42	PASS
11A	Ant1	5280	18	15.69	97.20	0.12	15.81	≤ 23.98	≤ 23.43	18.36	≤ 29.43	PASS
11A	Ant1	5320	18	14.16	97.20	0.12	14.28	≤ 23.98	≤ 23.41	16.83	≤ 29.41	PASS
11A	Ant1	5500	17	15.08	97.20	0.12	15.20	≤ 23.98	≤ 23.44	17.14	≤ 29.44	PASS
11A	Ant1	5580	17	15.05	97.20	0.12	15.17	≤ 23.98	≤ 23.44	17.11	≤ 29.44	PASS
11A	Ant1	5700	17	14.76	97.20	0.12	14.88	≤ 23.98	≤ 23.39	16.82	≤ 29.39	PASS

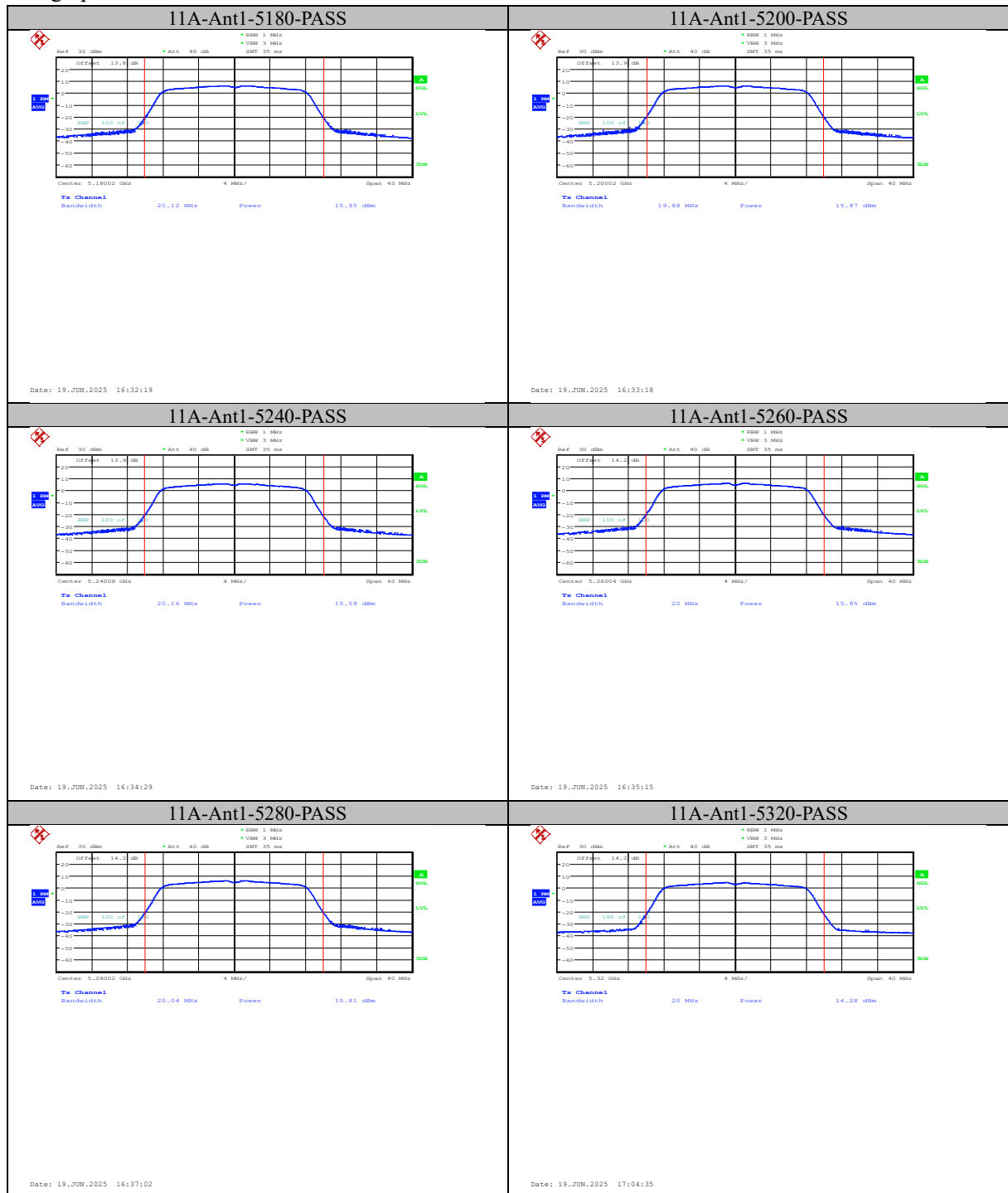
Note:

- 1.The Duty Cycle Factor is compensated in the graph.
2. In the graph, the Center frequency = (Low frequency of 26dB OBW + High frequency of 26dB OBW) /2.
- 3.The 11a data rate 6Mbps is selected as worse condition.
4. For client devices in the 5.15–5.25 GHz band, Limit =250mW.

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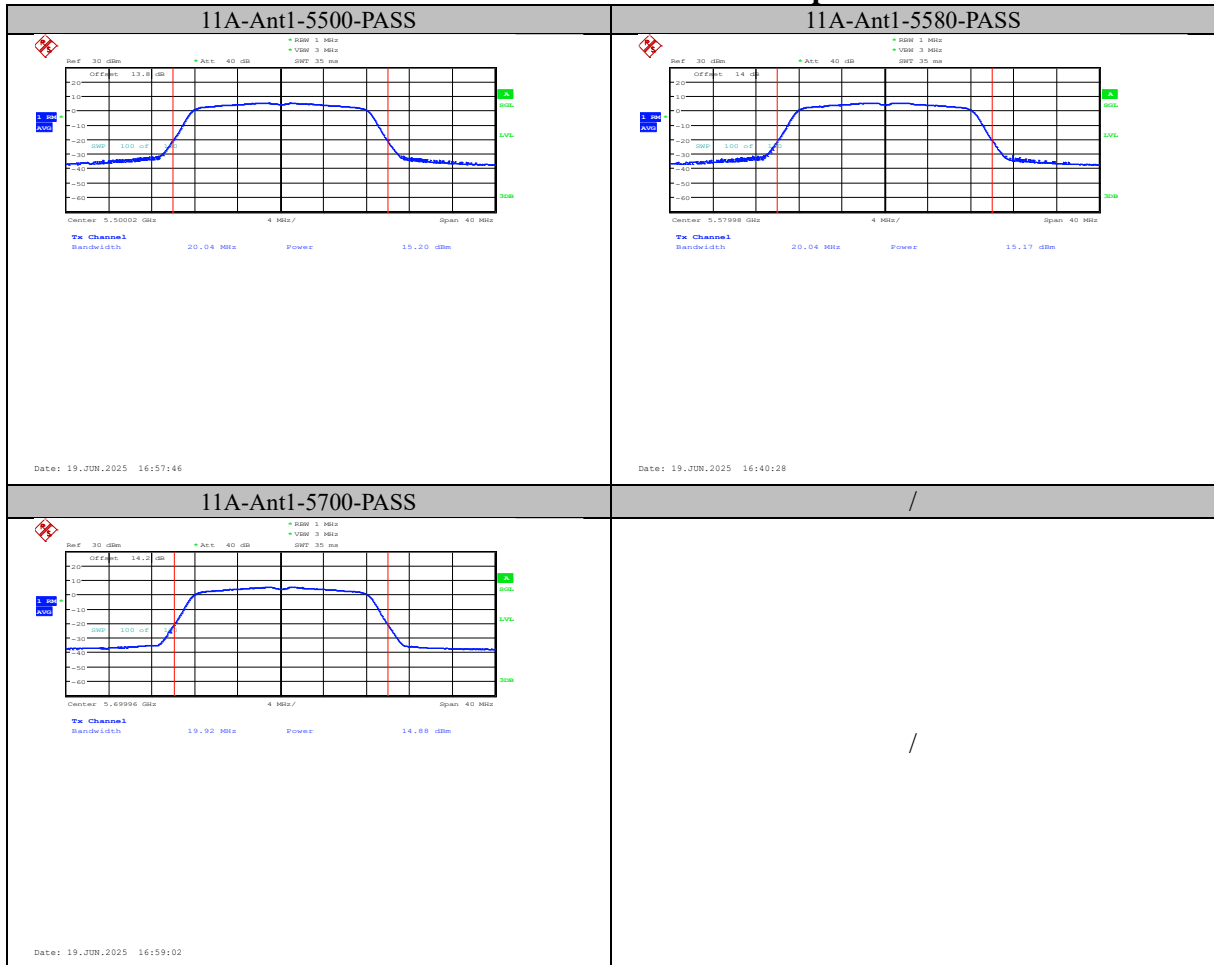
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Test graphs



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6.6 Band Edges Compliance

Specifications:	15.209,15.407(b), RSS-247 6.2, RSS-Gen 8.9
DUT Serial Number:	IMEI:862072070057688;862072070057696
Test conditions:	Ambient Temperature:15°C-35°C Relative Humidity:30%-60%RH Air pressure: 86-106kPa
Test Results:	Pass

Limit Level Construction:

Above 1G, non-restricted band

Standard	EIRP Limit
FCC Part 15.407(b)	< -27dBm/MHz
RSS-247 6.2	< -27dBm/MHz

Above 1G, Restricted band

Standard	EIRP Limit	
FCC Part 15.209	Peak	74dB μ V/m
	Average	54dB μ V/m
RSS-Gen 8.9	Peak	74dB μ V/m
	Average	54dB μ V/m

$$\text{EIRP[dBm]} = \text{E[dB}\mu\text{V/m]} + 20 \log(d[\text{m}]) - 104.7$$

$$\text{E[dB}\mu\text{V/m]} = \text{EIRP[dBm]} - 20 \log(d[\text{m}]) + 104.7$$

$$\text{E[dB}\mu\text{V/m]} = \text{EIRP[dBm]} + 95.2 = 68.2, \text{ for } d = 3\text{m}$$

Measurement Uncertainty:

Measurement Uncertainty	1 GHz to 6 GHz: 4.84 dB (k=2)
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Test Procedure:

The measurement is made according to KDB 789033.

Marker-Delta Method: The marker-delta method, as described in ANSI C63.10, can be used to perform measurements of the radiated unwanted emissions level of emissions provided that the 99% occupied bandwidth of the fundamental is within 2 MHz of the authorized band-edge.

Procedure for peak unwanted emissions measurements above 1000 MHz

The procedure for peak unwanted emissions measurements above 1000 MHz is as follows:

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- a) Follow the requirements in 12.7.4.
- b) Peak emission levels are measured by setting the instrument as follows:

- 1) RBW = 1 MHz.
- 2) VBW $\geq [3 \times \text{RBW}]$.
- 3) Detector = peak.
- 4) Sweep time = auto.
- 5) Trace mode = max hold.

6) Allow sweeps to continue until the trace stabilizes. Note that if the transmission is not continuous, then the time required for the trace to stabilize will increase by a factor of approximately $1 / D$, where D is the duty cycle. For example, at 50% duty cycle, the measurement time will increase by a factor of two, relative to measurement time for continuous transmission.

Procedures for average unwanted emissions measurements above 1000 MHz

- a) RBW = 1 MHz.

- b) Video bandwidth:

1) If the EUT is configured to transmit with $D \geq 98\%$, then set $\text{VBW} \leq \text{RBW} / 100$ (i.e., 10 kHz), but not less than 10 Hz.

2) If the EUT D is $< 98\%$, then set $\text{VBW} \geq 1 / T$, where T is defined in item a1) of 12.2.

- c) Video bandwidth mode or display mode:

1) The instrument shall be set with video filtering applied in the power domain. Typically, this requires setting the detector mode to RMS (power averaging) and setting the average-VBW type to power (rms).

2) As an alternative, the instrument may be set to linear detector mode. Video filtering shall be applied in linear voltage domain (rather than in a log or dB domain). Some instruments require linear display mode to accomplish this. Others have a setting for average-VBW type, which can be set to “voltage” regardless of the display mode.

- d) Detector = peak.

- e) Sweep time = auto.

- f) Trace mode = max hold.

g) Allow max hold to run for at least 50 traces if the transmitted signal is continuous or has at least 98% duty cycle. For lower duty cycles, increase the minimum number of traces by a factor of $1/x$, where D is the duty cycle. For example, use at least 200 traces if the duty cycle is 25%. (If a specific emission is

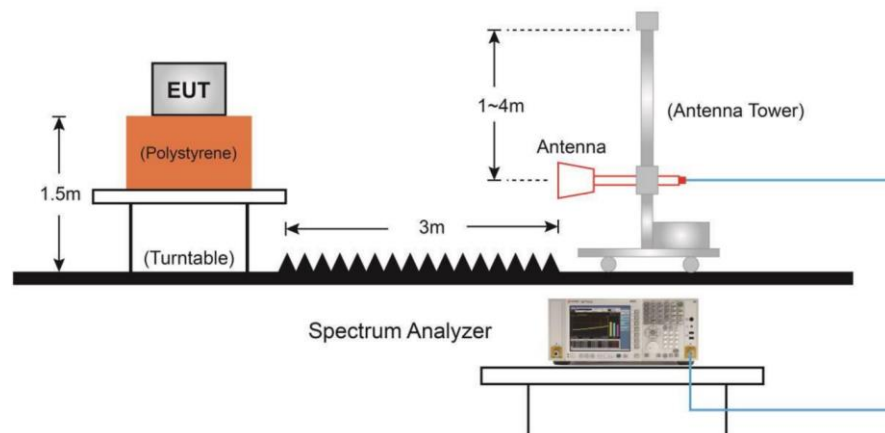
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demonstrated to be continuous—i.e., 100% duty cycle—then rather than turning ON and OFF with the transmit cycle, at least 50 traces should be averaged.)

The measurement was applied in a fully anechoic chamber. While testing for spurious emission higher than 1 GHz, if applied, the pre-amplifier would be equipped just at the output terminal of the antenna. Tabletop devices shall be placed on a nonconducting platform with nominal top surface dimensions 1 m by 1.5 m. For emission measurements above 1 GHz, the table height shall be 1.5 m. The turntable rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna which was mounted on an antenna mast. During the tests, the antenna height varied from 1m to 4m and the EUT azimuth were varied from 0° to 360° in order to identify the maximum level of emissions from the EUT. In making any tests involving handheld, body-worn, or ceiling-mounted equipment, it is essential to recognize that the measured levels may be dependent on the orientation (attitude) of the three orthogonal axes of the EUT. Thus, exploratory tests as specified in 8.3.1 shall be carried out for various axes orientations to determine the attitude having maximum or near-maximum emission level. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

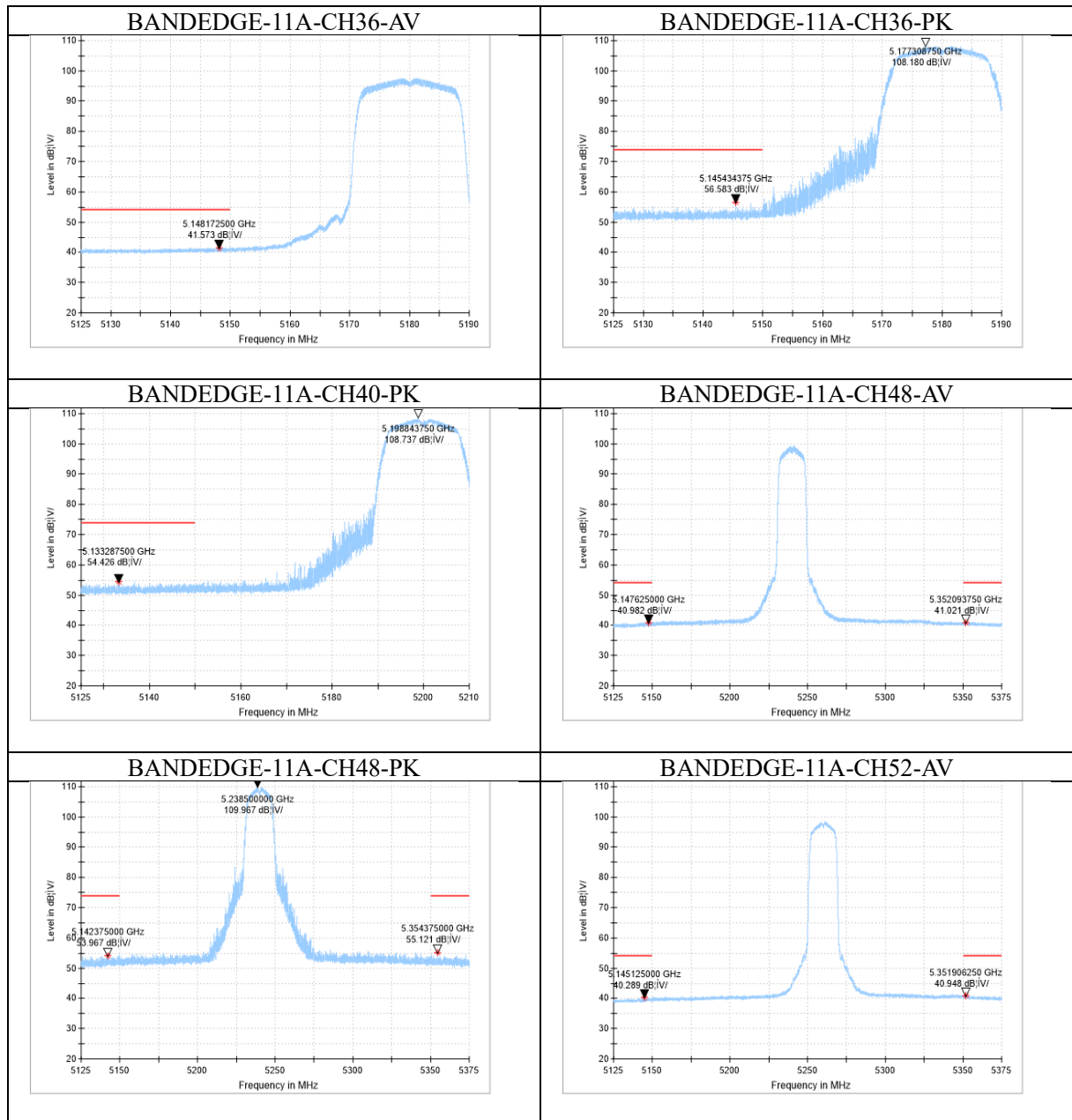
Test Setup



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Measurement Results:

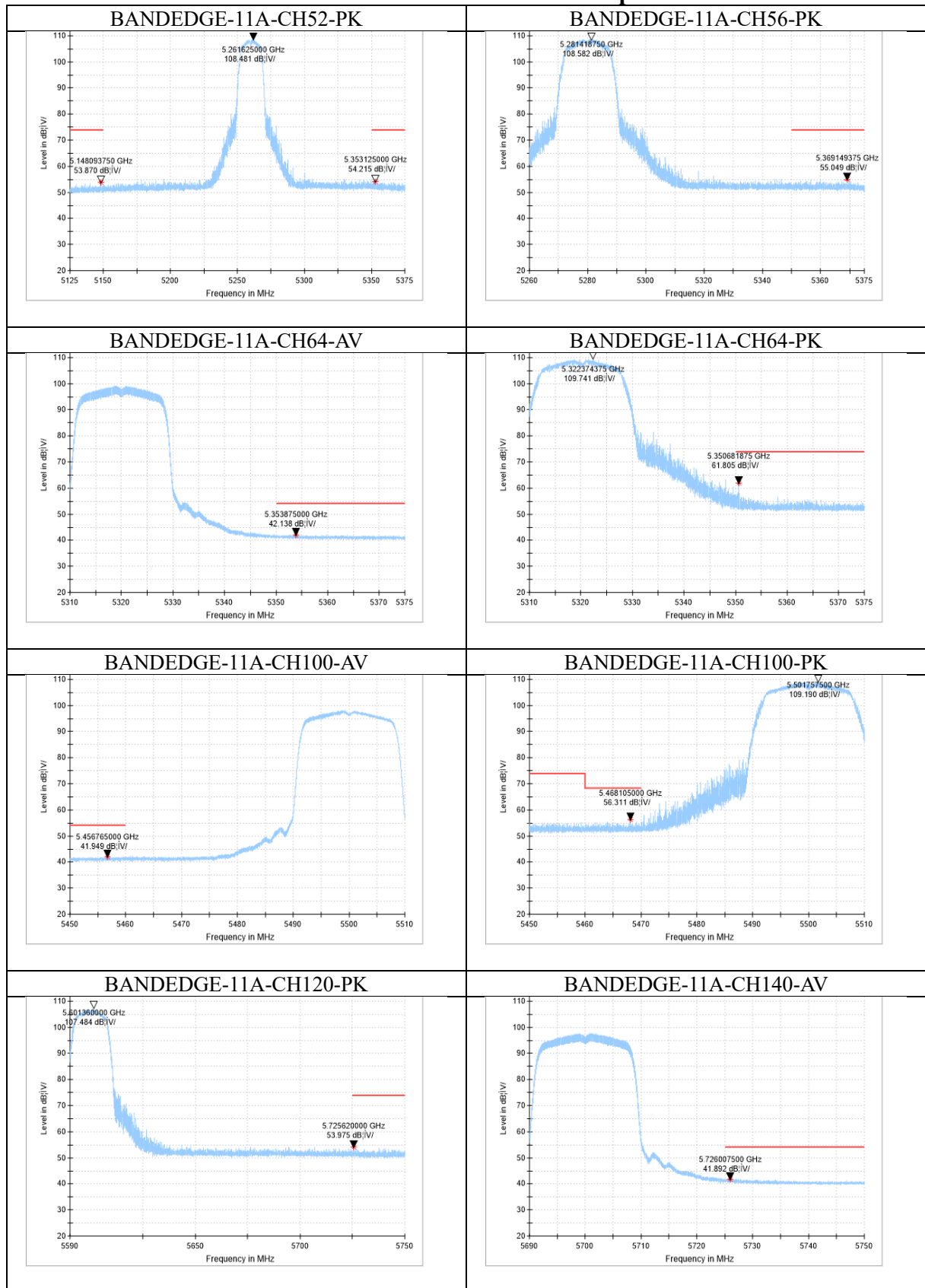


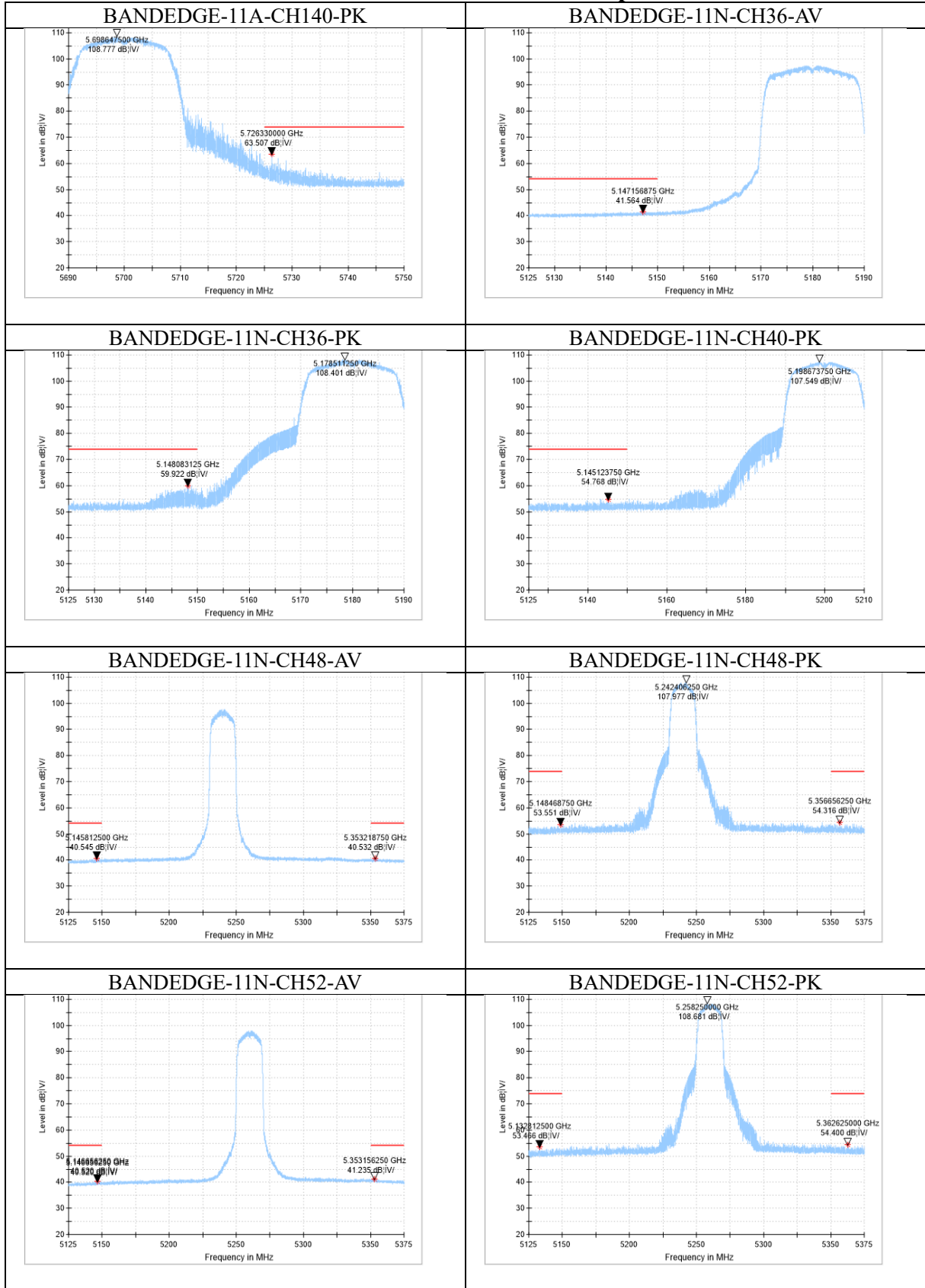
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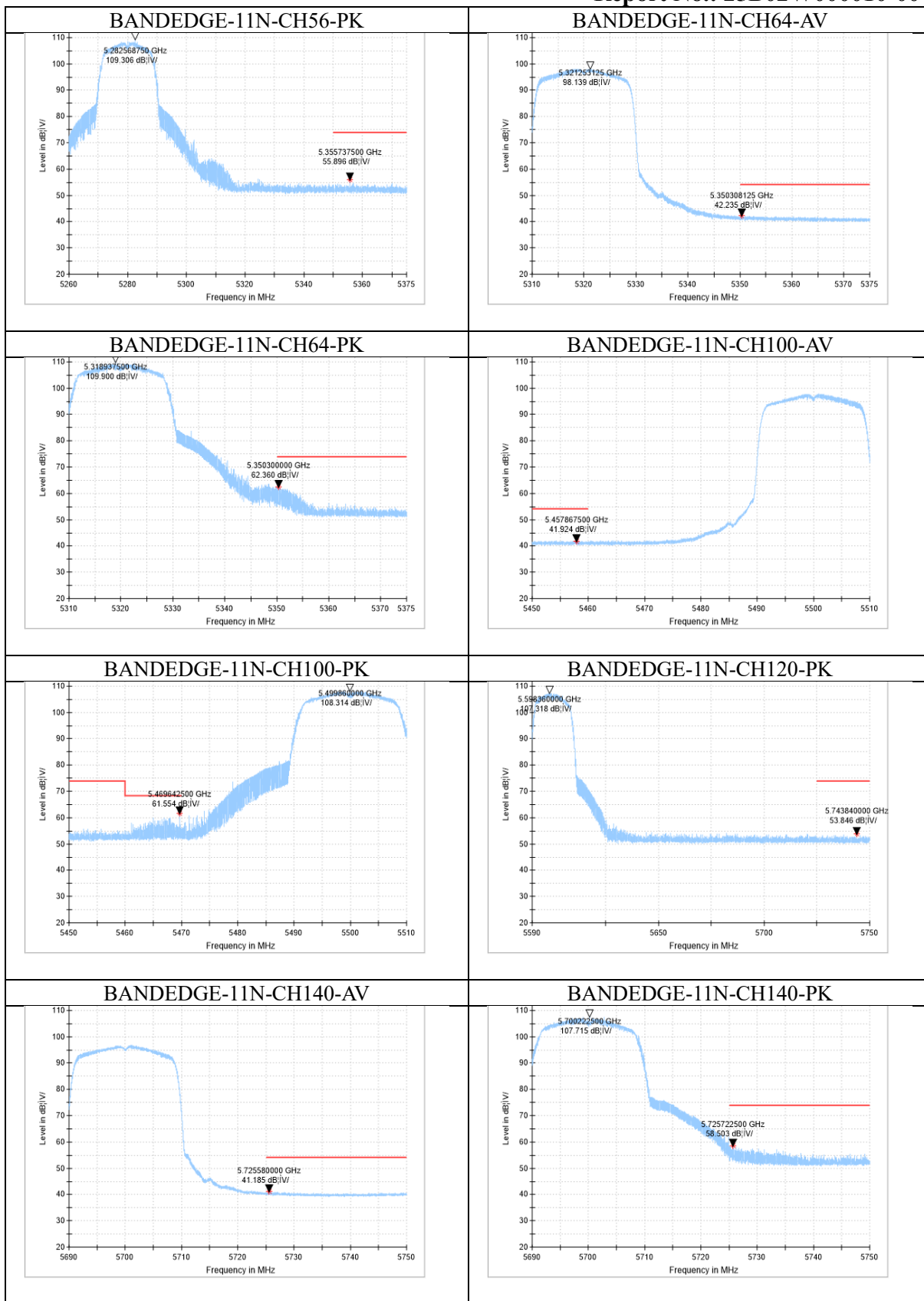
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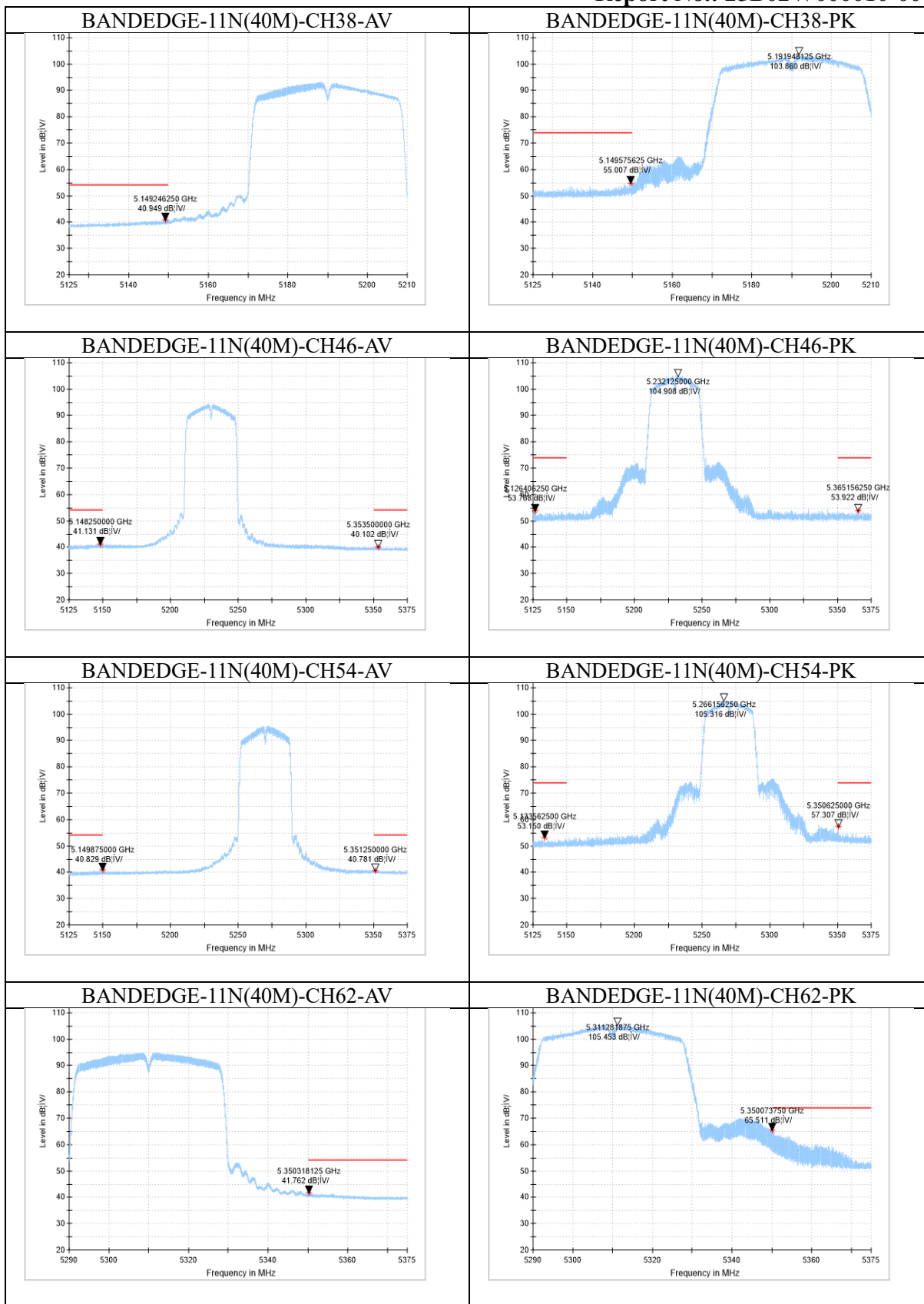
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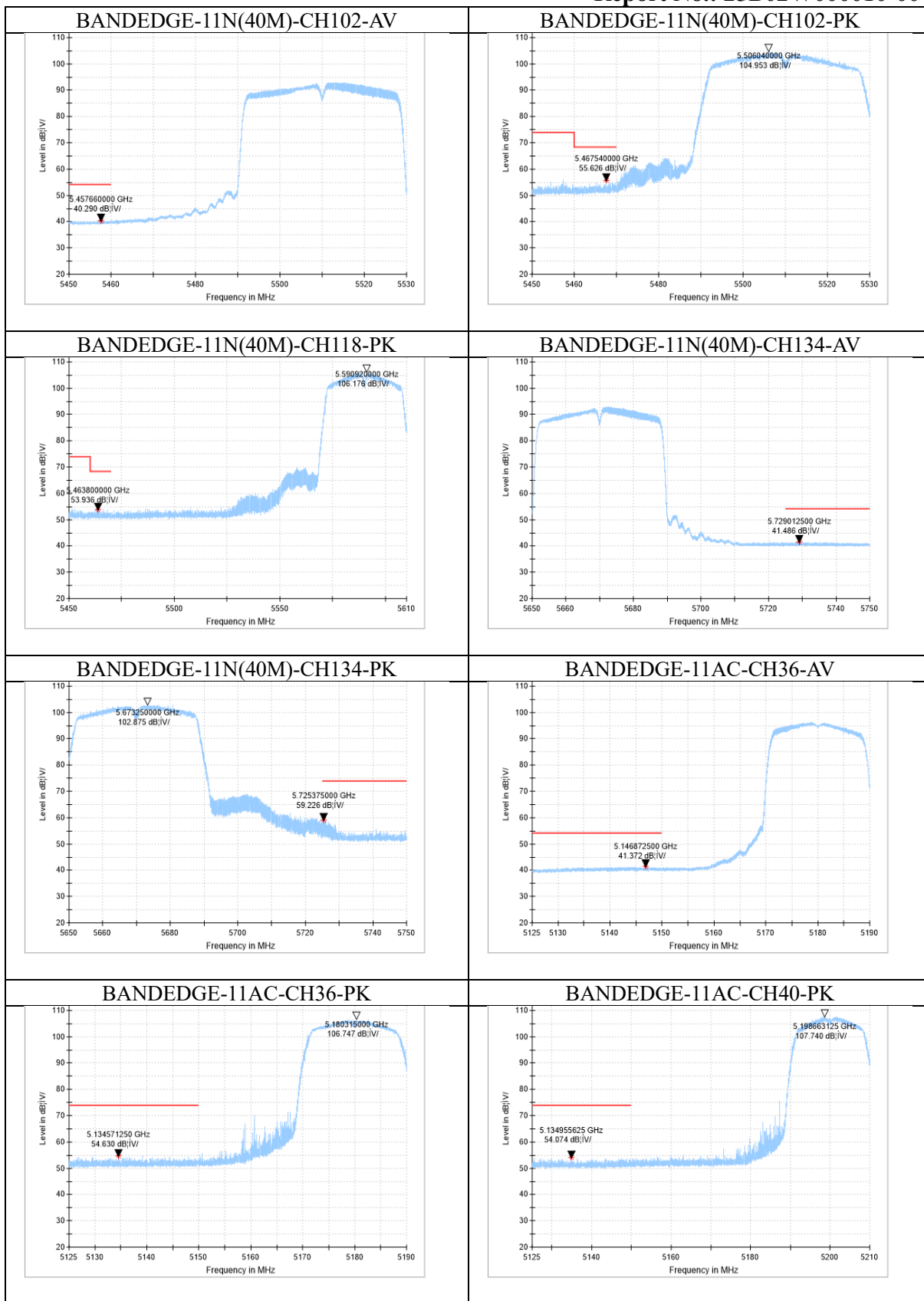


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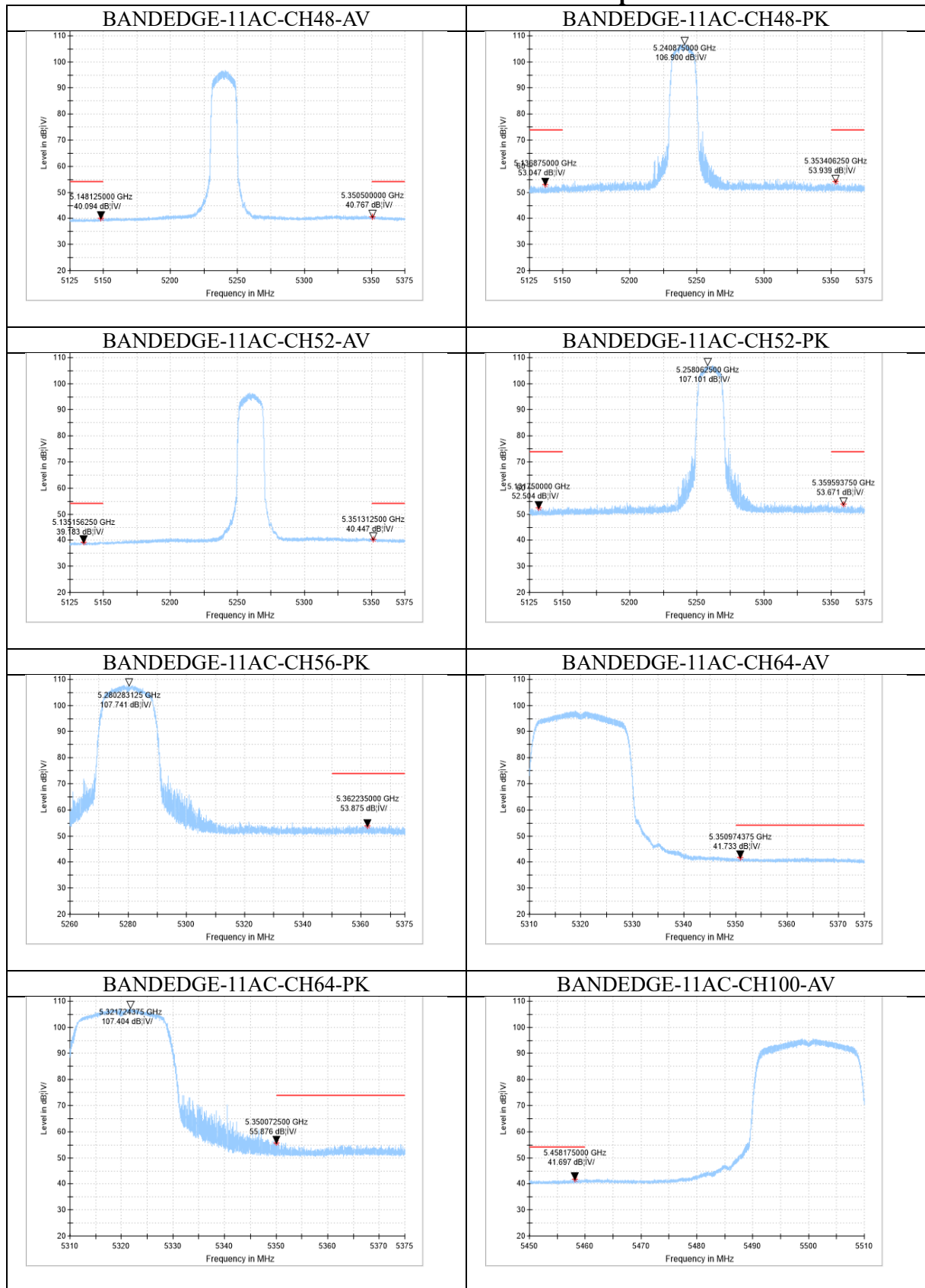


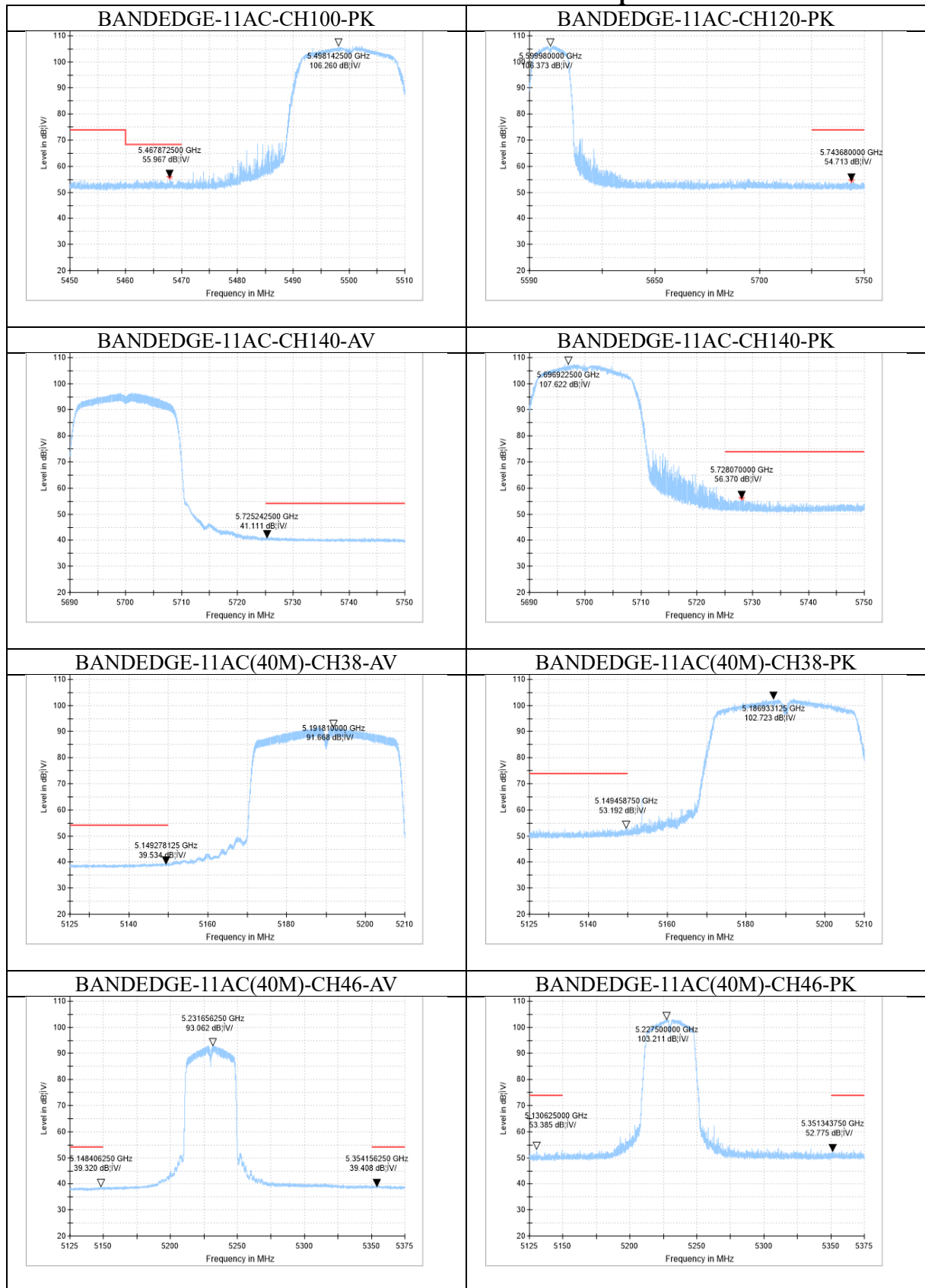
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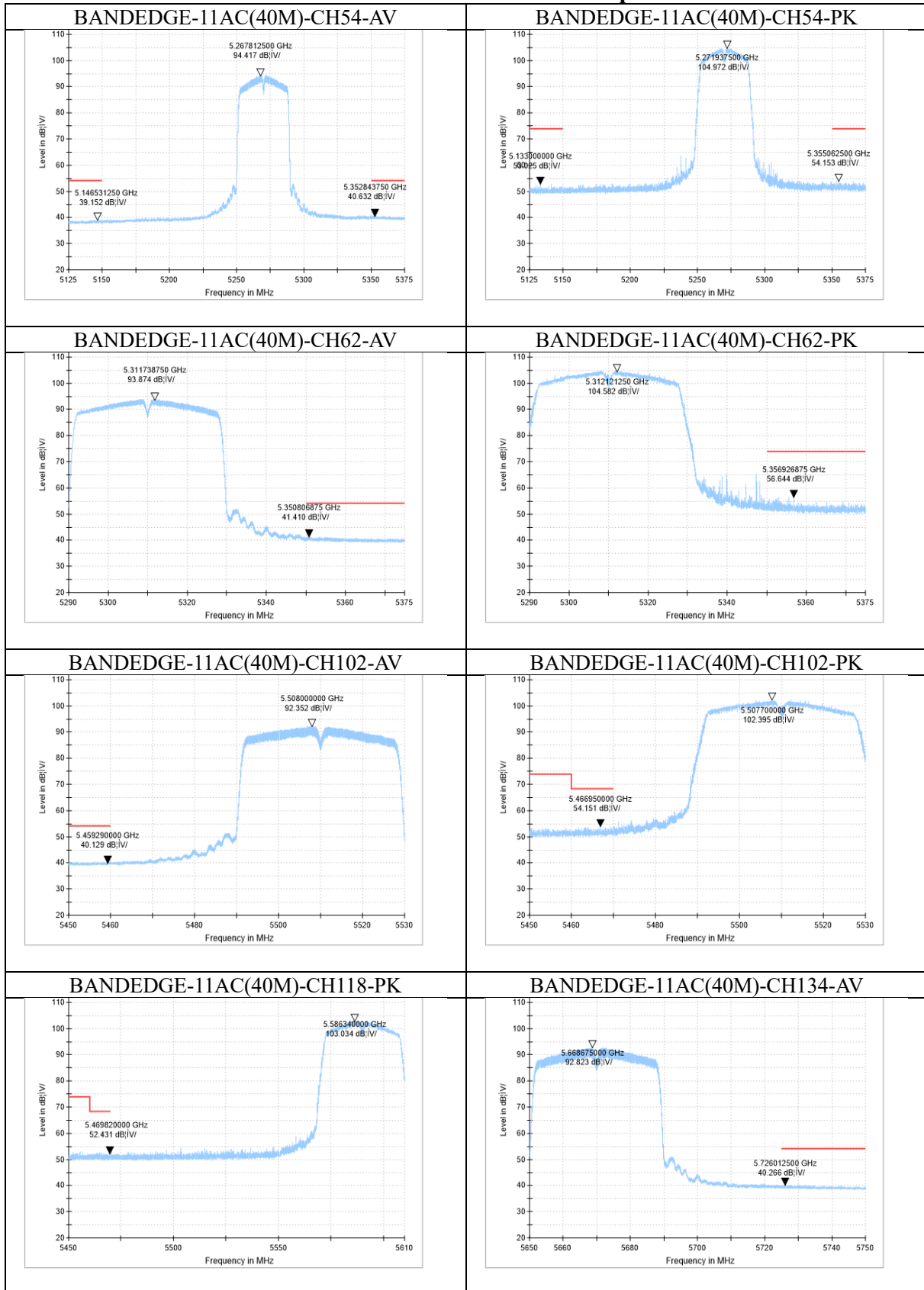
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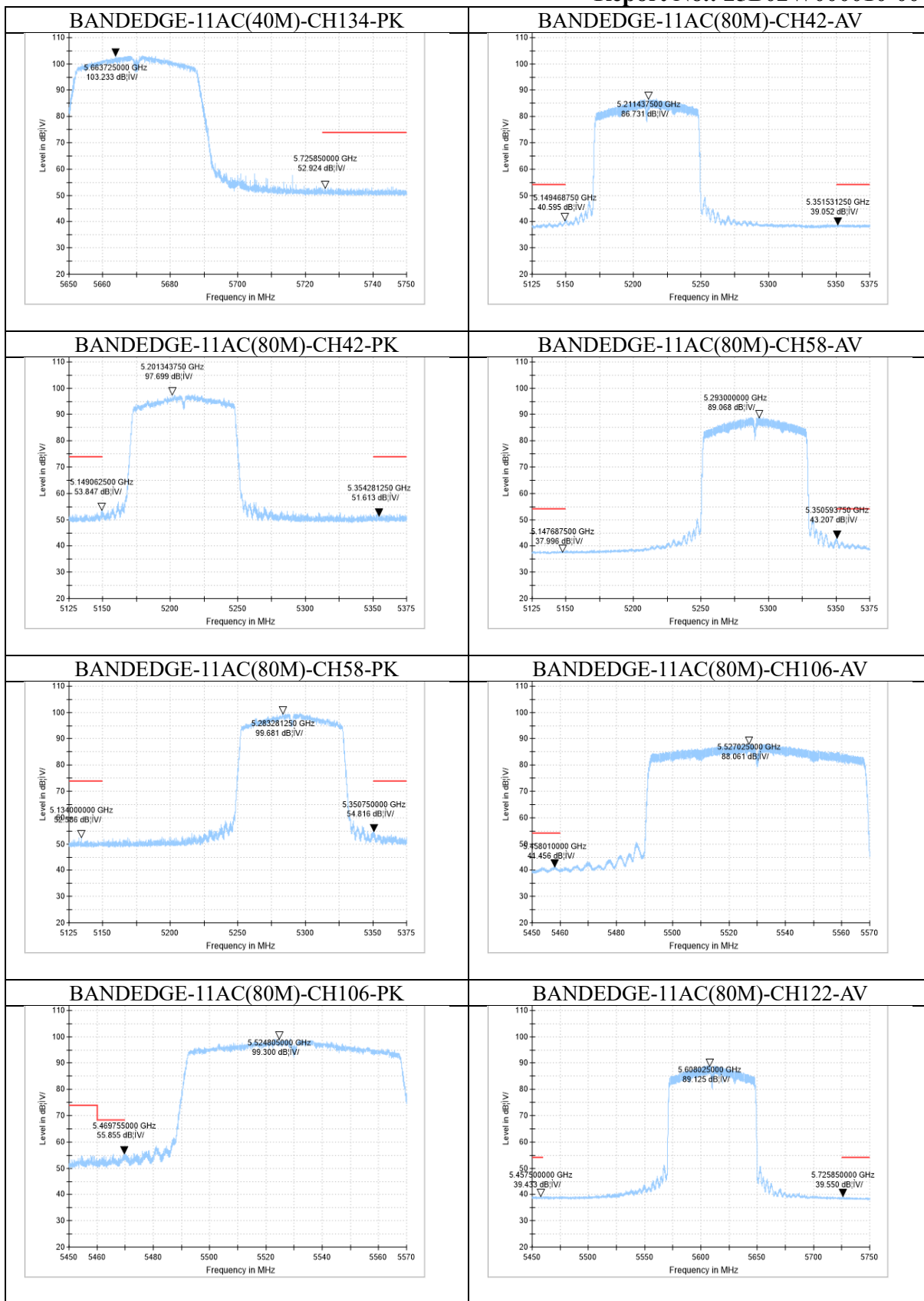
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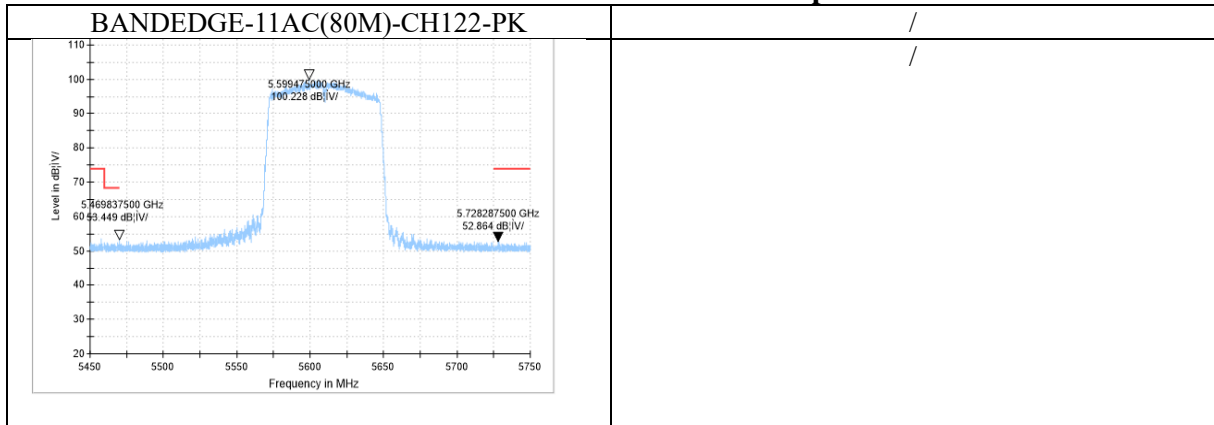
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Note:

1. Horizontal and vertical polarity is all have been tested, the result of them is synthesized in the above data diagram.

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6.7 Transmitter Spurious Emission

Specifications:	15.209 & 15.407(b),RSS-247 6.2, RSS-Gen 8.9
DUT Serial Number:	IMEI:862072070057688;862072070057696
Test conditions:	Ambient Temperature:15°C-35°C Relative Humidity:30%-60%RH Air pressure: 86-106kPa
Test Results:	Pass

Limit Level Construction:

Below 1G

Frequency of emission (MHz)	Field strength(dBμV/m)	Measurement distance(m)
0.009-0.490	129-94	3
0.490-1.705	74-63	3
1.705-30	70	3
30-88	40.0	3
88-216	43.5	3
216-960	46.0	3
Above 960	54.0	3

Note: for frequency range below 960MHz, the limit in 15.209 is defined in 10m test distance. The limit used above is calculated from 10m to 3m.

Above 1G, non-restricted band

Standard	EIRP Limit
FCC Part 15.407(b)	-27dBm/MHz
RSS-247 6.2	-27dBm/MHz

Above 1G, Restricted band

Standard	EIRP Limit	
15.209	Peak	74dBμV/m
	Average	54dBμV/m
RSS-Gen 8.9	Peak	74dBμV/m
	Average	54dBμV/m

$$\text{EIRP[dBm]} = \text{E[dB}\mu\text{V/m]} + 20 \log (\text{d[m]}) - 104.7$$

$$\text{E[dB}\mu\text{V/m]} = \text{EIRP[dBm]} - 20 \log (\text{d[m]}) + 104.7$$

$$\text{E[dB}\mu\text{V/m]} = \text{EIRP[dBm]} + 95.2 = 68.2, \text{ for } \text{d} = 3\text{m}$$

Measurement Uncertainty:

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Measurement Uncertainty	30MHz-150MHz 3.38 dB (k=2) 150MHz-1000MHz 4.09dB (k=2) 1000MHz-6000MHz 4.84 dB (k=2) 6000MHz-18000MHz 4.52 dB (k=2) 18000MHz-26500MHz 6.19 dB (k=2) 26500MHz-40000MHz 6.03 dB (k=2)
-------------------------	--

Test Procedure:

The measurement is made according to KDB 789033

Set the spectrum analyzer in the following:

Procedure for Unwanted Emissions Measurements below 1000 MHz:

- a) Follow the requirements in II.G.3. “General Requirements for Unwanted Emissions Measurements.”
- b) Compliance shall be demonstrated using CISPR quasi-peak detection; however, peak detection is permitted as an alternative to quasi-peak detection.

Detector: Peak and Quasi-Peak

RBW=100kHz / VBW=300kHz / Sweep=AUTO

Procedure for Unwanted Maximum Emissions Measurements above 1000 MHz:

- a) Follow the requirements in II.G.3, “General Requirements for Unwanted Emissions Measurements.”

- b) Maximum emission levels are measured by setting the analyzer as follows:

(i) RBW = 1 MHz.

(ii) VBW $\geq$ 3 MHz.

(iii) Detector = Peak.

(iv) Sweep time = auto.

(v) Trace mode = max hold.

(vi) Allow sweeps to continue until the trace stabilizes. Note that if the transmission is not continuous, the time required for the trace to stabilize will increase by a factor of approximately 1/x, where x is the duty cycle. For example, at 50% duty cycle, the measurement time will increase by a factor of two relative to measurement time for continuous transmission.

Procedures for Average Unwanted Emissions Measurements above 1000 MHz:

- a) Follow the requirements in section II.G.3., “General Requirements for Unwanted Emissions Measurements.”
- b) Average emission levels shall be measured using one of the following two methods.
- c) Method AD (Average Detection): Primary method

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(i) RBW = 1 MHz.

(ii) VBW $\geq$ 3 MHz.

(iii) Detector = power averaging (rms), if span/(# of points in sweep) $\leq$ RBW/2. Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If the condition is not satisfied, the detector mode shall be set to peak.

(iv) Averaging type = power averaging (rms)

As an alternative, the detector and averaging type may be set for linear voltage averaging. Some instruments require linear display mode in order to use linear voltage averaging. Log or dB averaging shall not be used.

(v) Sweep time = auto.

(vi) Perform a trace average of at least 100 traces if the transmission is continuous. If the transmission is not continuous, the number of traces shall be increased by a factor of $1/x$, where x is the duty cycle. For example, with 50% duty cycle, at least 200 traces shall be averaged. (If a specific emission is demonstrated to be continuous—i.e., 100% duty cycle—rather than turning on and off with the transmit cycle, at least 100 traces shall be averaged.)

(vii) If tests are performed with the EUT transmitting at a duty cycle less than 98%, a correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100% duty cycle. The correction factor is computed as follows:

If power averaging (rms) mode was used in step (iv) above, the correction factor is $10 \log (1/x)$, where x is the duty cycle. For example, if the transmit duty cycle was 50%, then 3 dB must be added to the measured emission levels.

If linear voltage averaging mode was used in step (iv) above, the correction factor is $20 \log (1/x)$, where x is the duty cycle. For example, if the transmit duty cycle was 50%, then 6 dB must be added to the measured emission levels.

If a specific emission is demonstrated to be continuous (100% duty cycle) rather than turning on and off with the transmit cycle, no duty cycle correction is required for that emission.

Portable, small, lightweight, or modular devices that may be handheld, worn on the body, or placed on a table during operation shall be positioned on a non-conducting platform, the top of which is 80 cm above the reference ground plane. The preferred area occupied by the EUT arrangement is 1 m by 1.5 m. For emissions testing at or below 1 GHz, the table height shall be 80 cm above the reference ground plane. For emission

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measurements above 1 GHz, the table height shall be 1.5 m. but it may be larger or smaller to accommodate various sized EUTs. For testing purposes, ceiling- and wall-mounted devices also shall be positioned on a tabletop (see also ANSI C63.10-2013 section 6.3.4 and 6.3.5). In making any tests involving handheld, body-worn, or ceiling-mounted equipment, it is essential to recognize that the measured levels may be dependent on the orientation (attitude) of the three orthogonal axes of the EUT. Thus, exploratory tests as specified in 8.3.1 shall be carried out for various axes orientations to determine the attitude having maximum or near-maximum emission level.

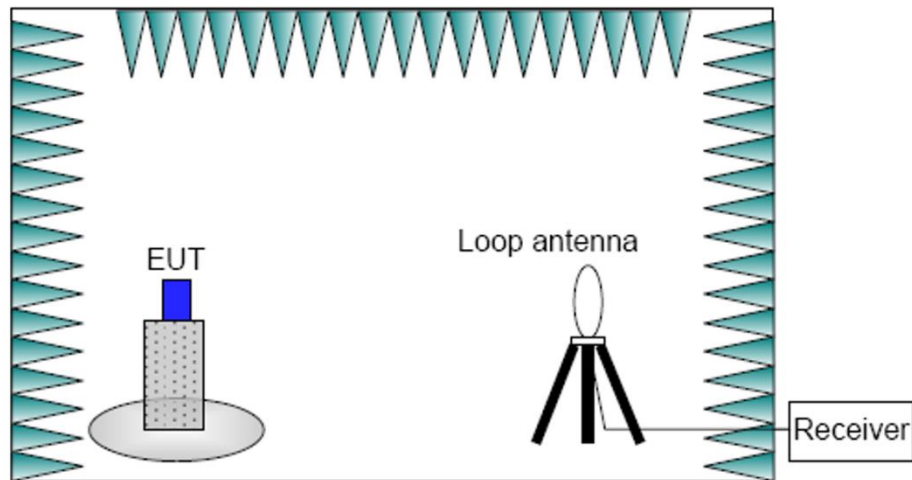
The EUT was placed on a non-conductive table. Below 18GHz , the measurement antenna was placed at a distance of 3 meters from the EUT. Above 18GHz , the measurement antenna was placed at a distance of 1 meter from the EUT. During the tests, the antenna height varied from 1m to 4m and the EUT azimuth were varied from 0° to 360° in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

Remark:

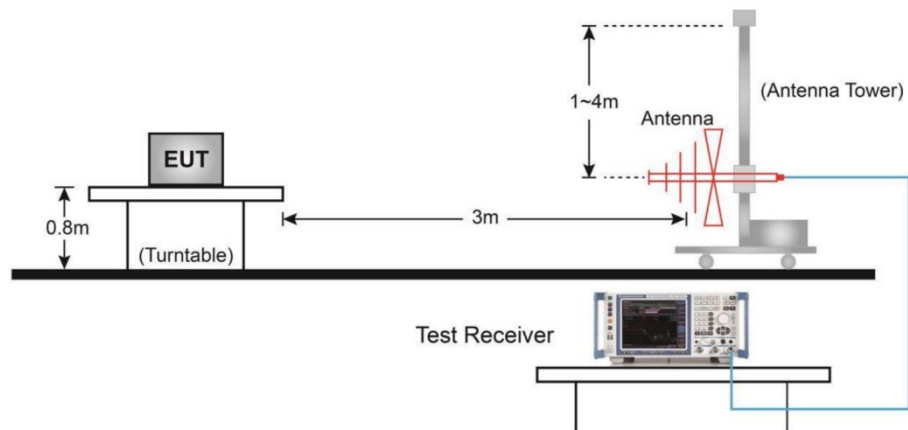
1. Factor= Antenna Factor + Cable Loss (-Amplifier, is employed)
2. Measured level= Original Receiver Reading + Factor
3. Margin = Limit – Measured level
4. If the PK measured level is lower than AV limit, the AV test can be elided

Test Setup

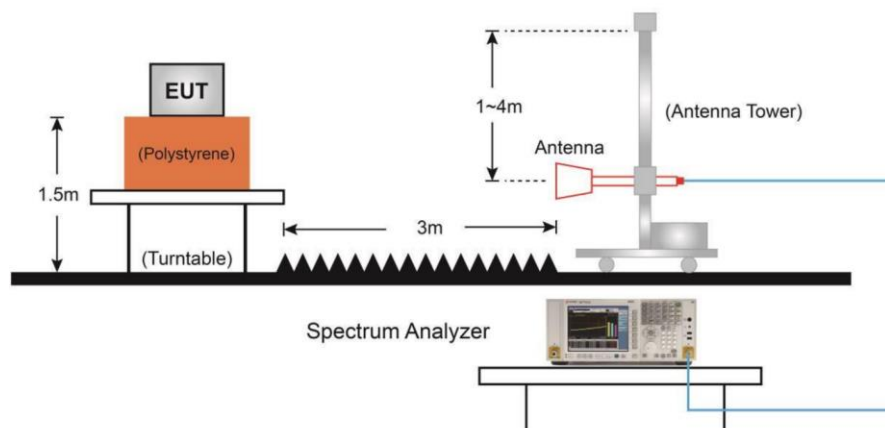
Below 30MHz Test Setup



Below 1GHz Test Setup



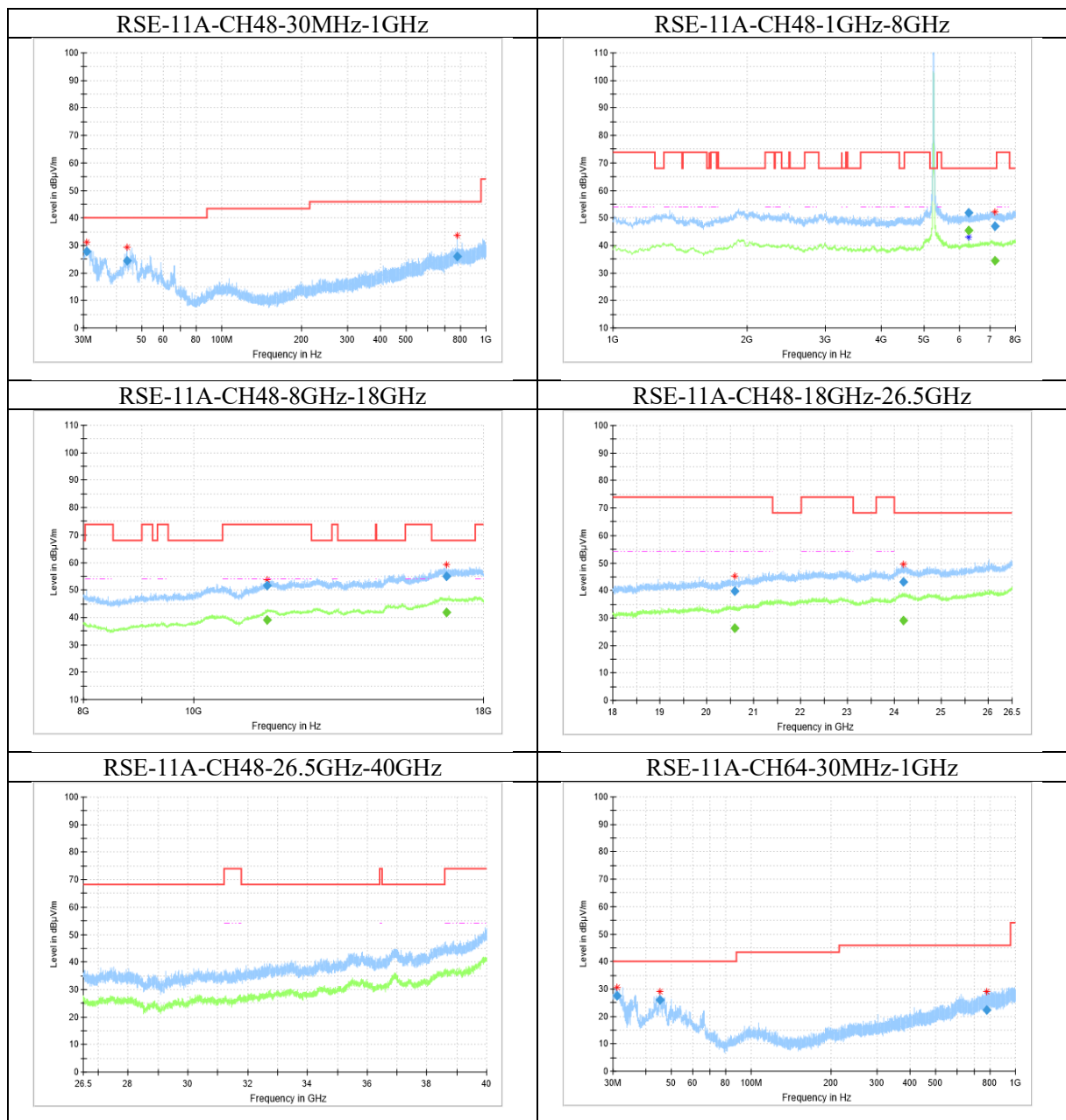
Above 1GHz Test Setup



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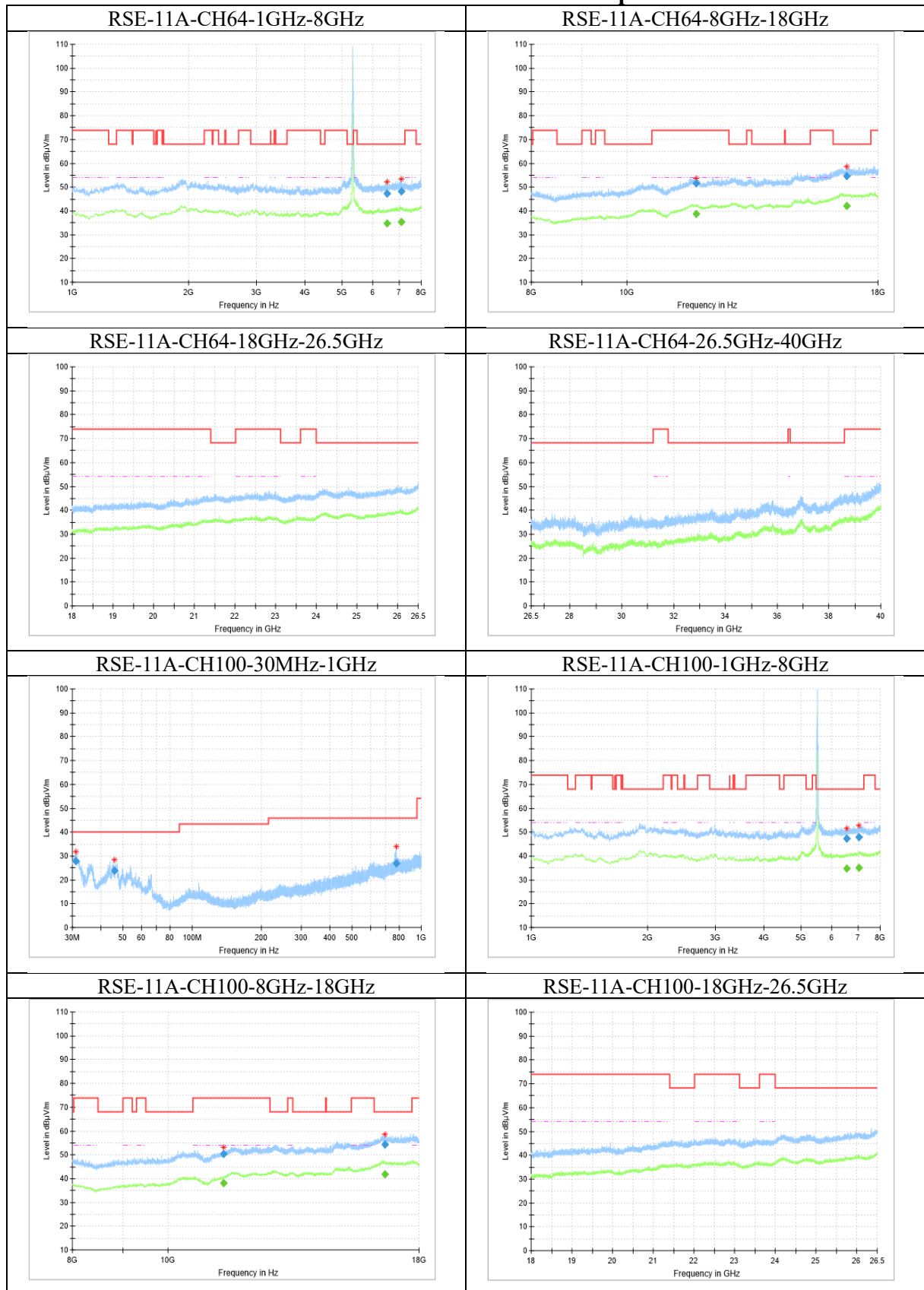
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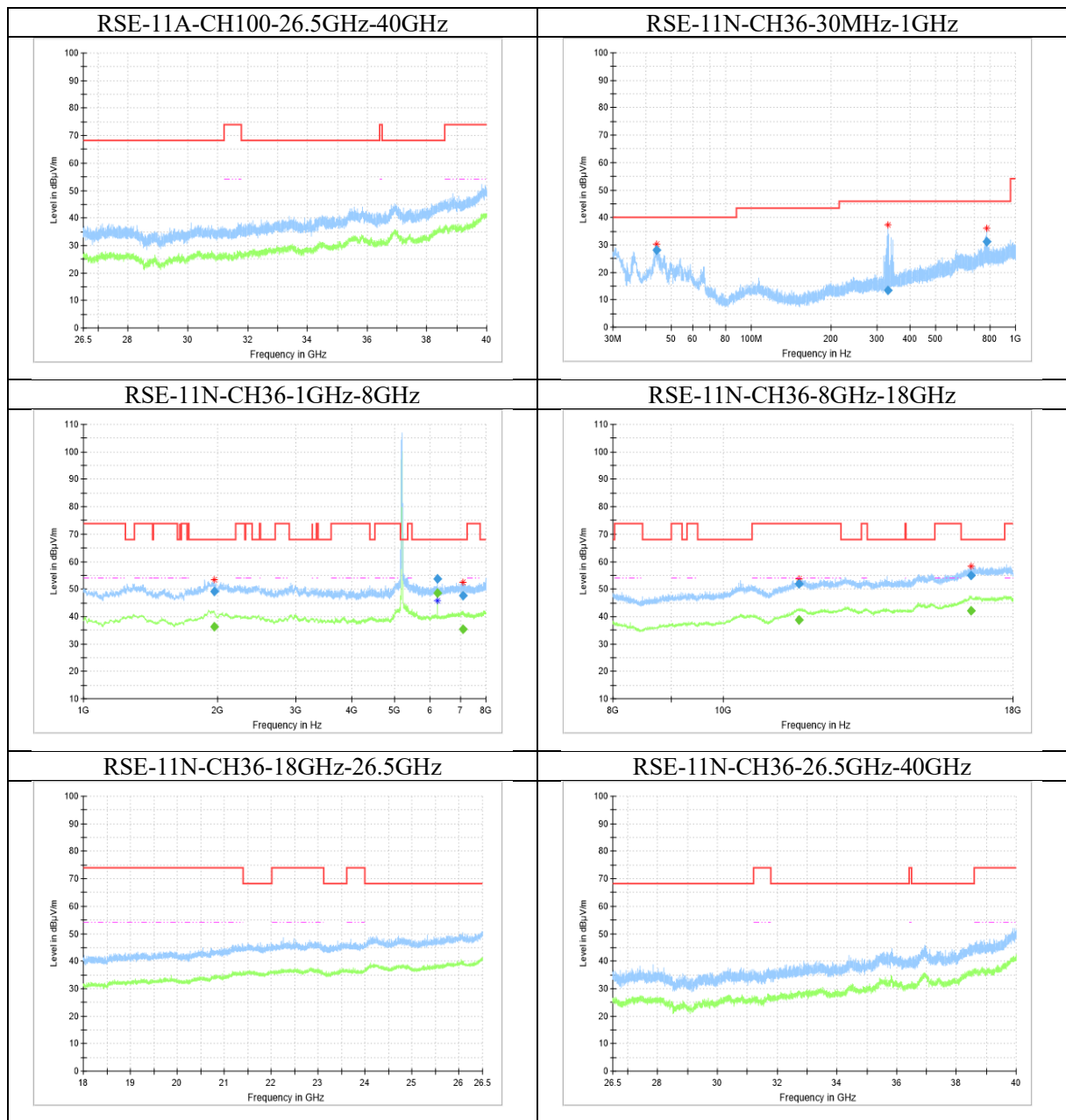
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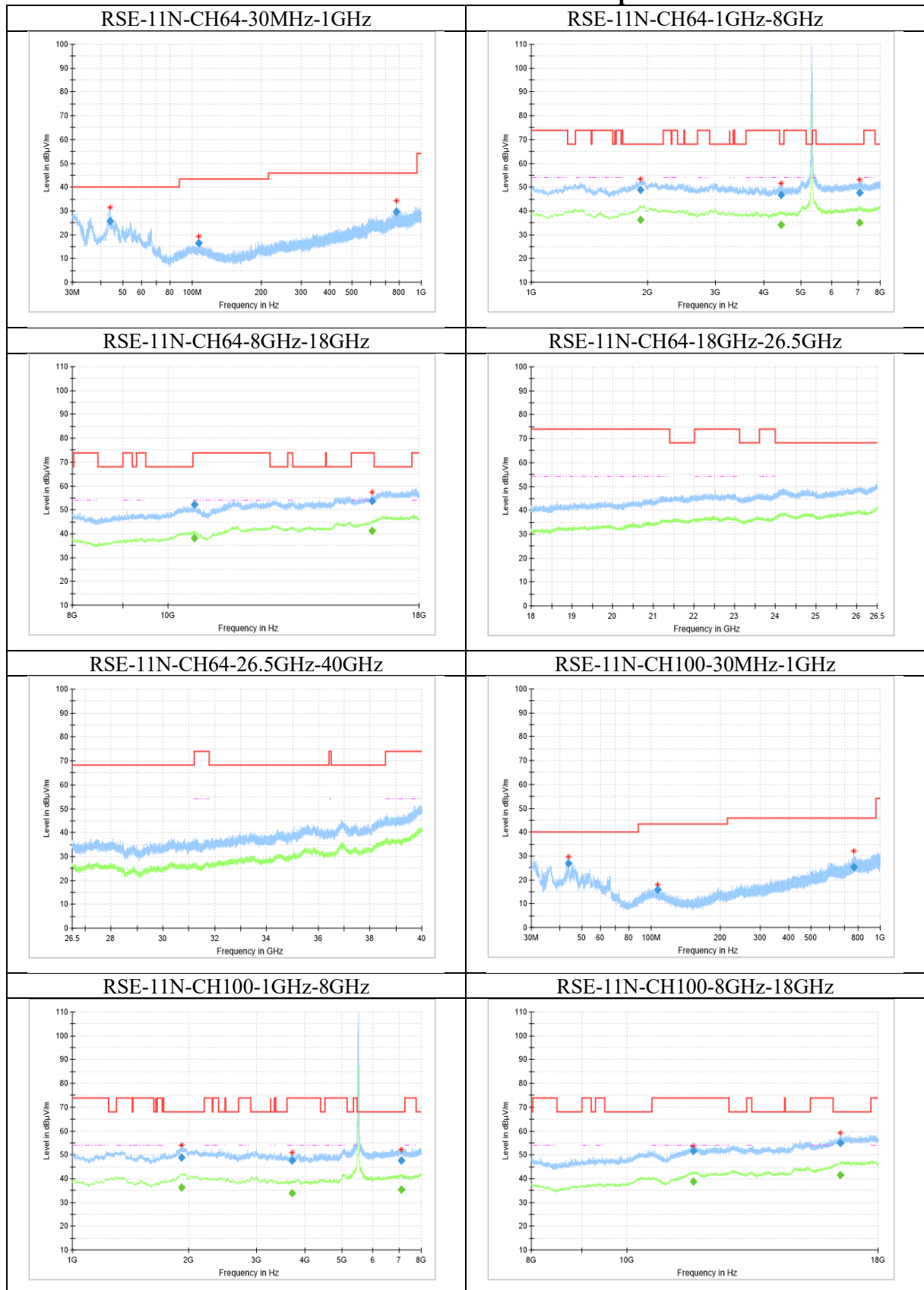
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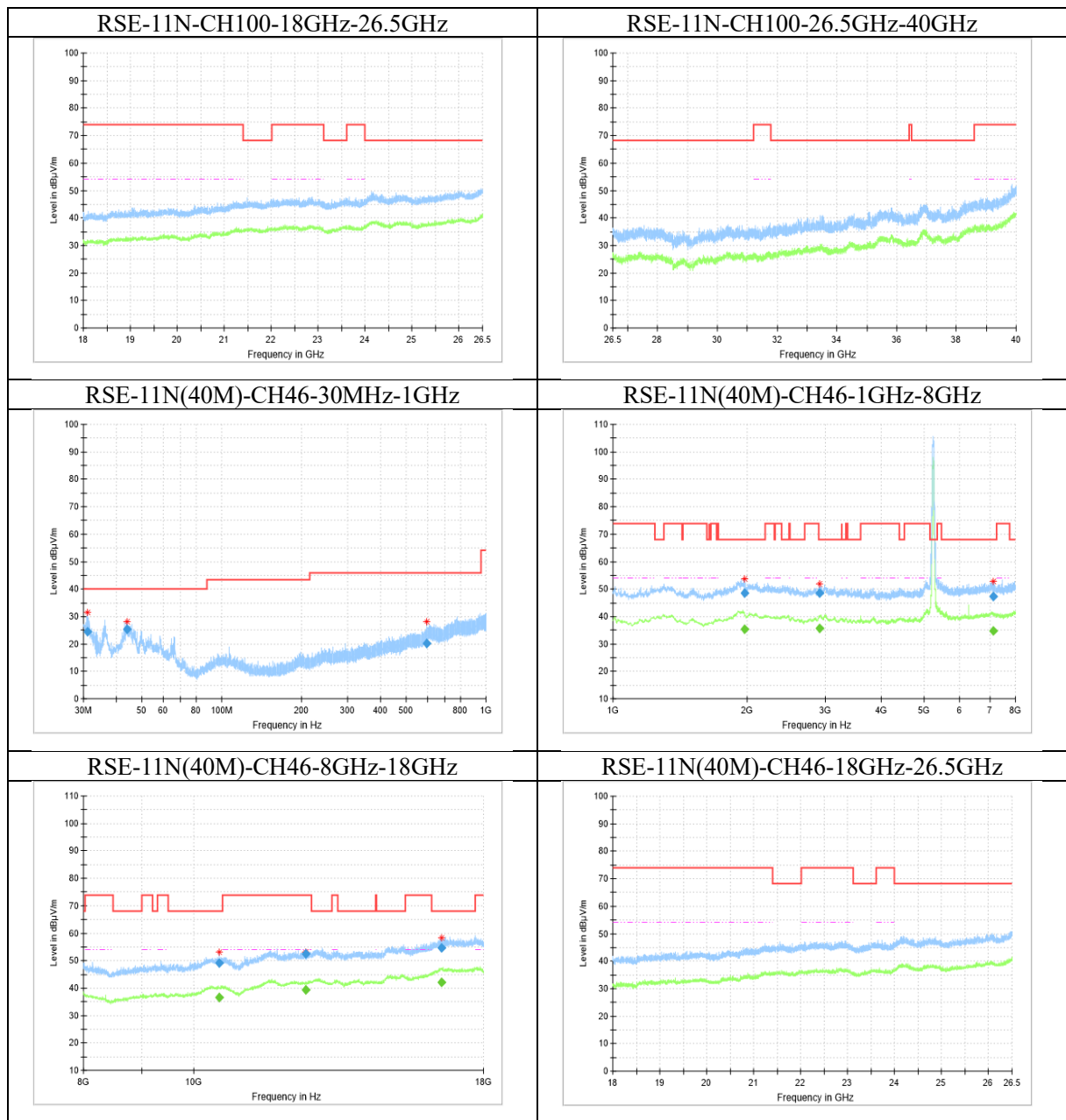
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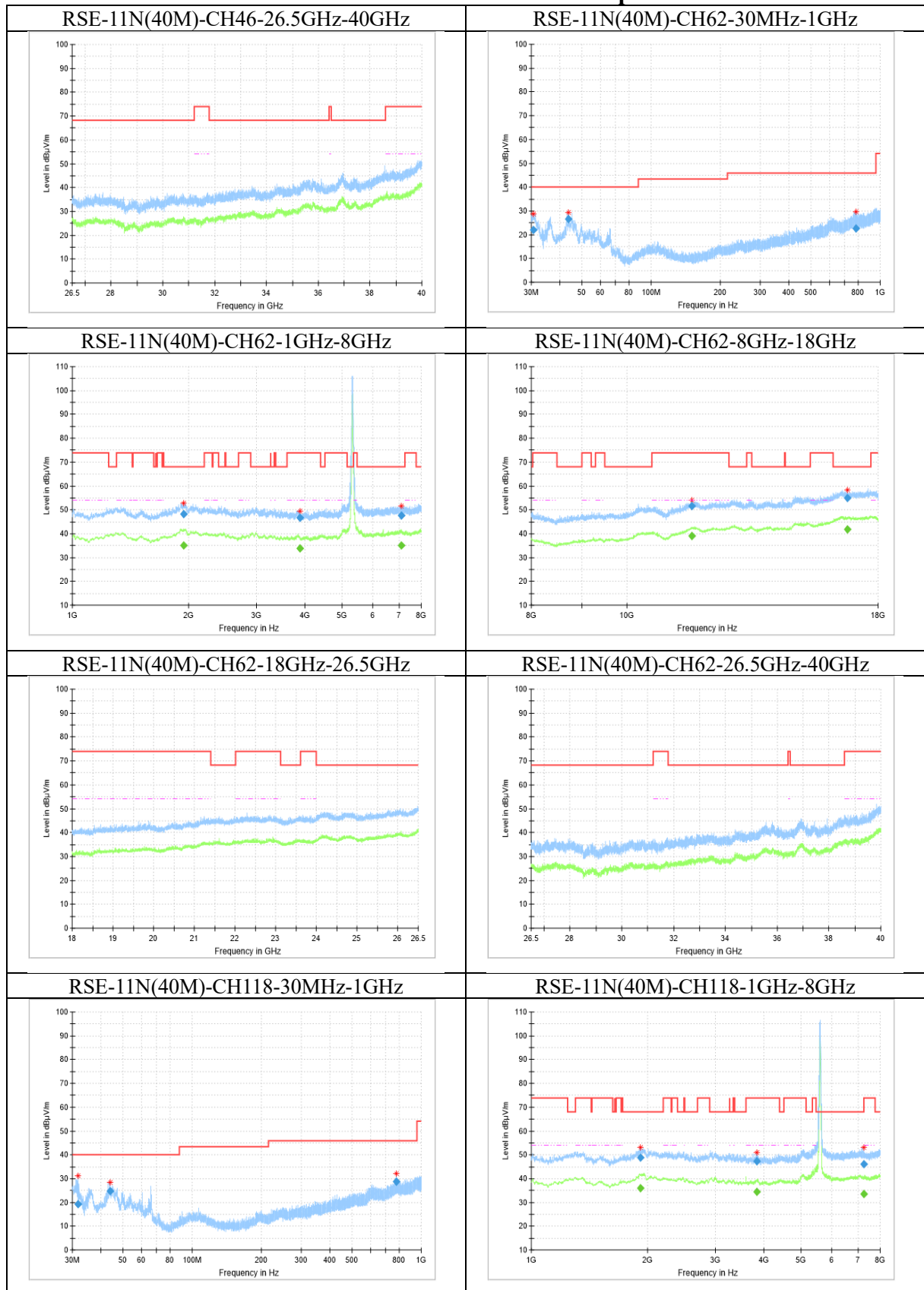
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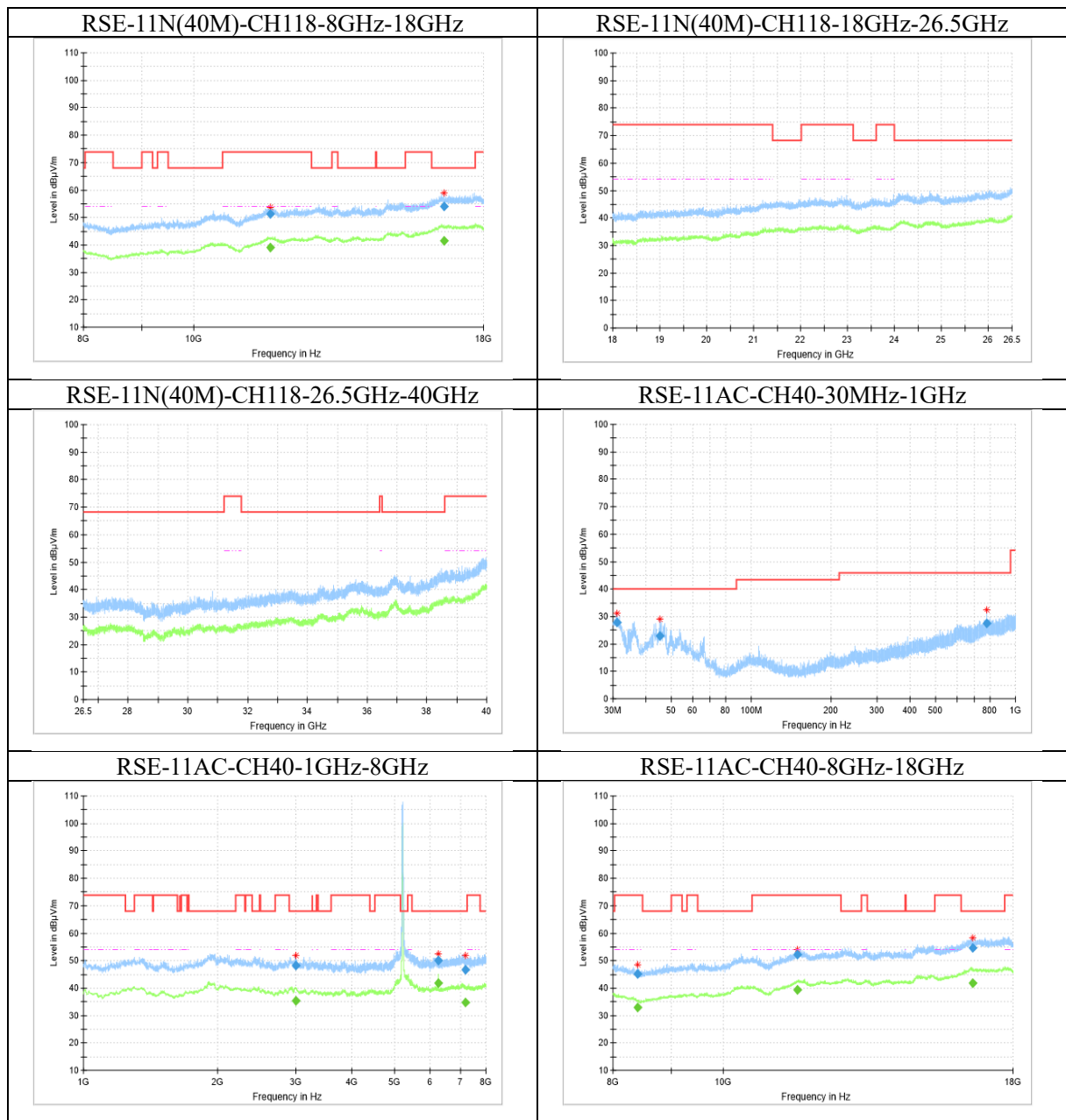
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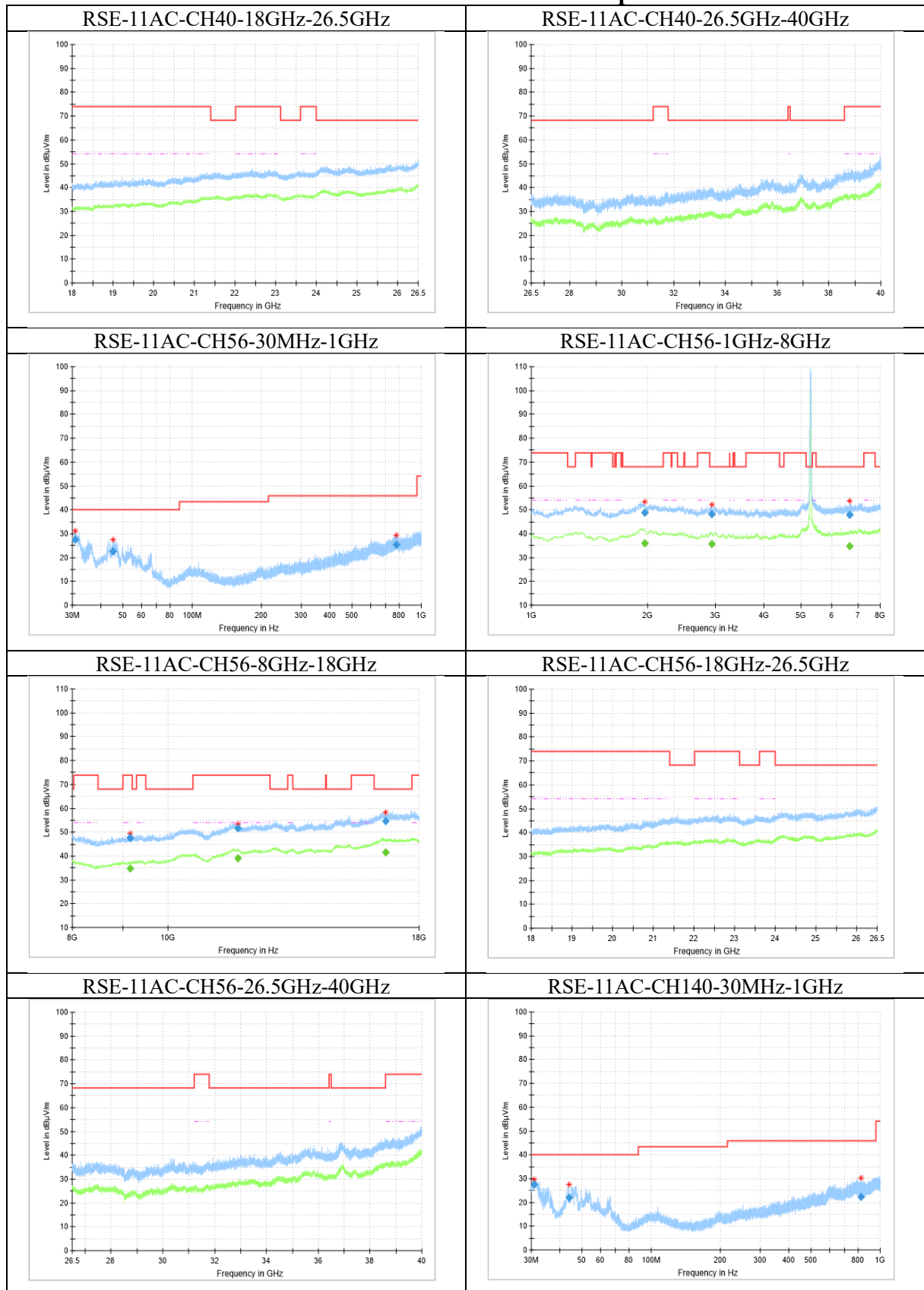
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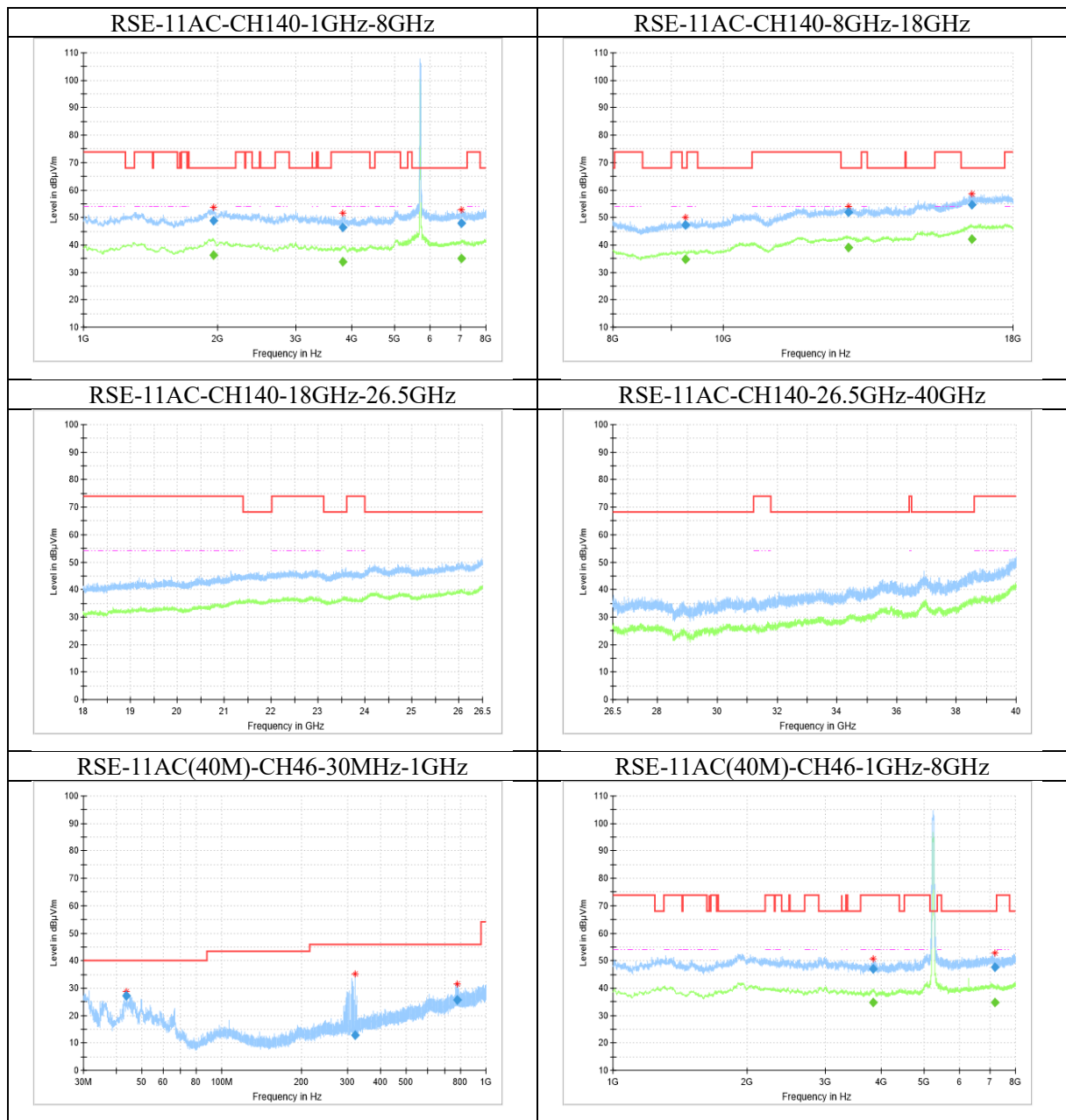
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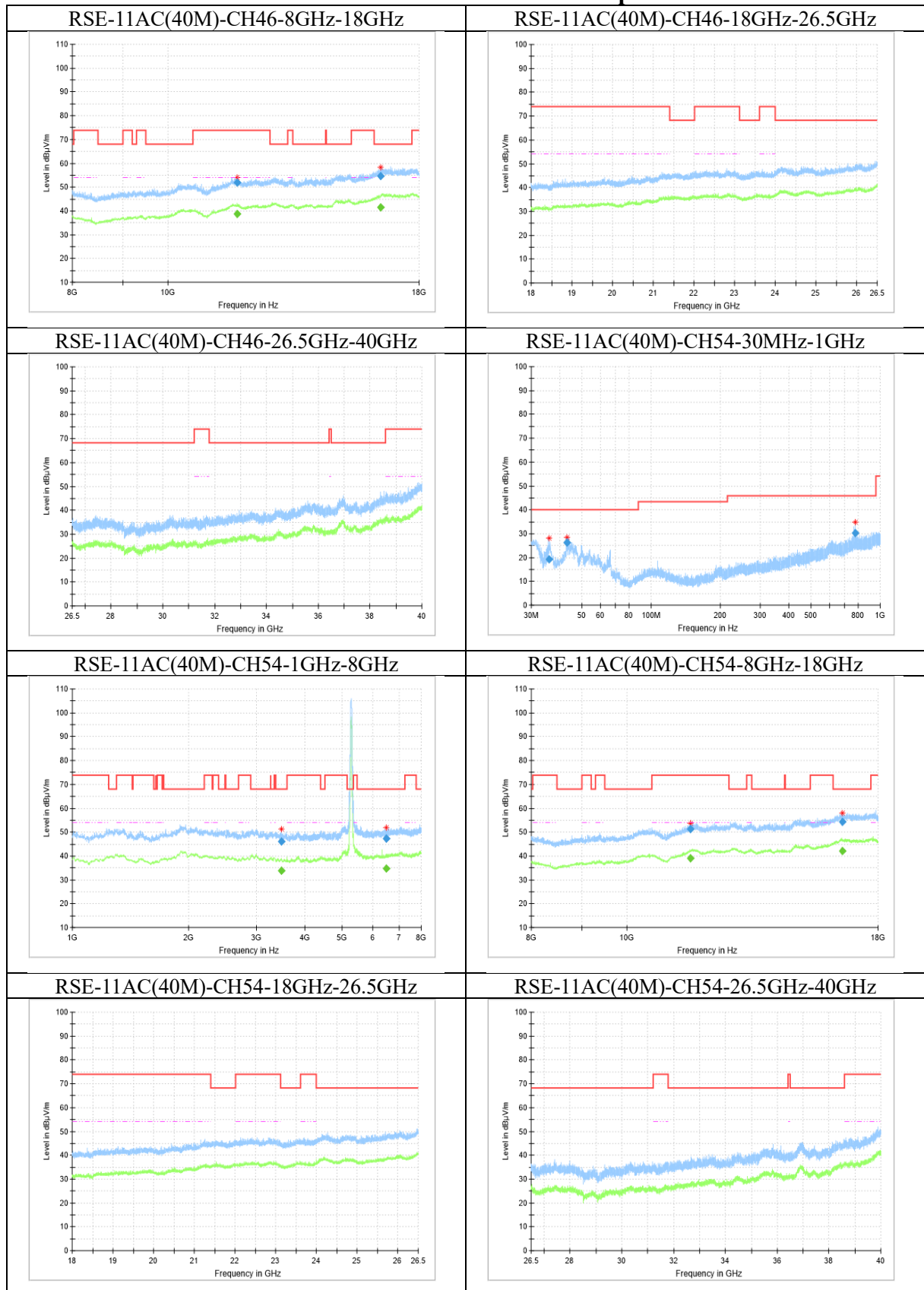
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