

Contention Based Protocol

Test place	Ise EMC Lab. No.8 Measurement Room	
Date	February 13, 2024	February 14, 2024
Temperature / Humidity	25 deg. C / 39 % RH	24 deg. C / 42 % RH
Engineer	Yuta Moriya	Yuta Moriya
Mode	Communication 11ax-20 / 11ax-160	

Incumbent signal plots

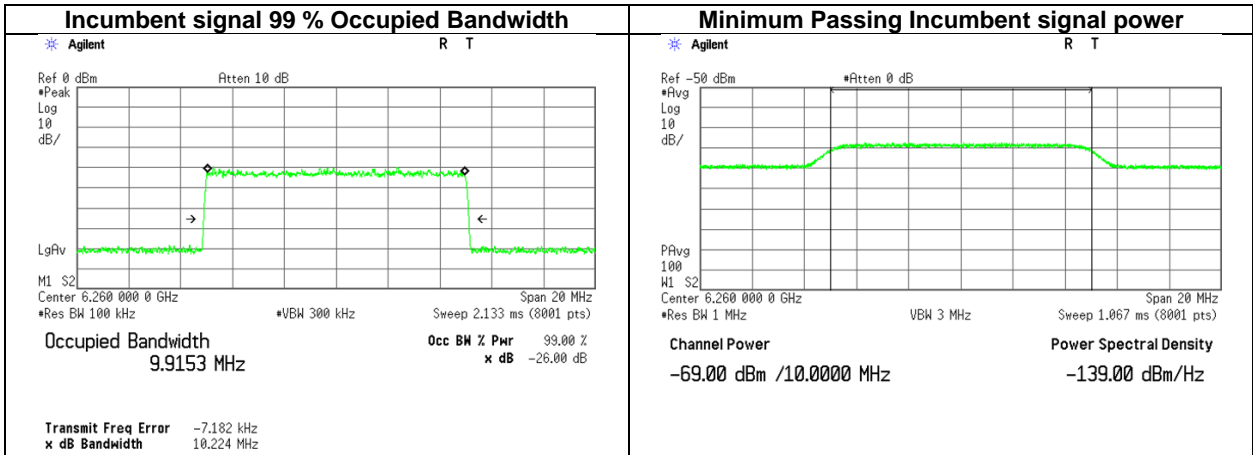
[20MHz BW mode]

All tests were conducted with the Incumbent Signal frequency set to the middle of EUT channel and a nominal 99% Occupied Power Bandwidth of 10 MHz.

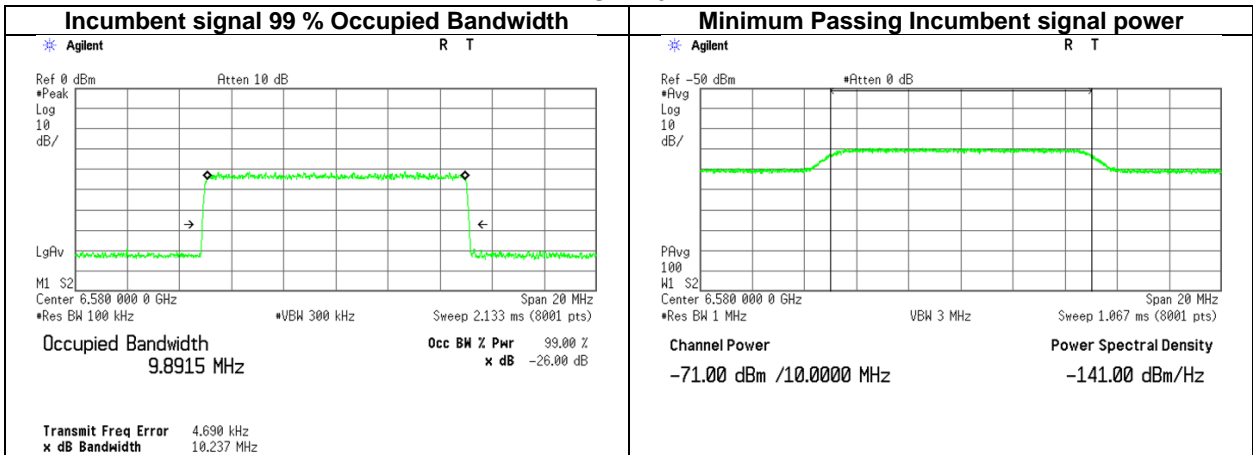
[160MHz BW mode]

All tests were conducted with the Incumbent Signal frequency set to as closely as possible to the power edge of the EUT channel, in the middle of EUT channel, and as closely as possible to the upper edge of the EUT channel and a nominal 99% Occupied Power Bandwidth of 10 MHz.

**Reference Plot
 U-NII-5**



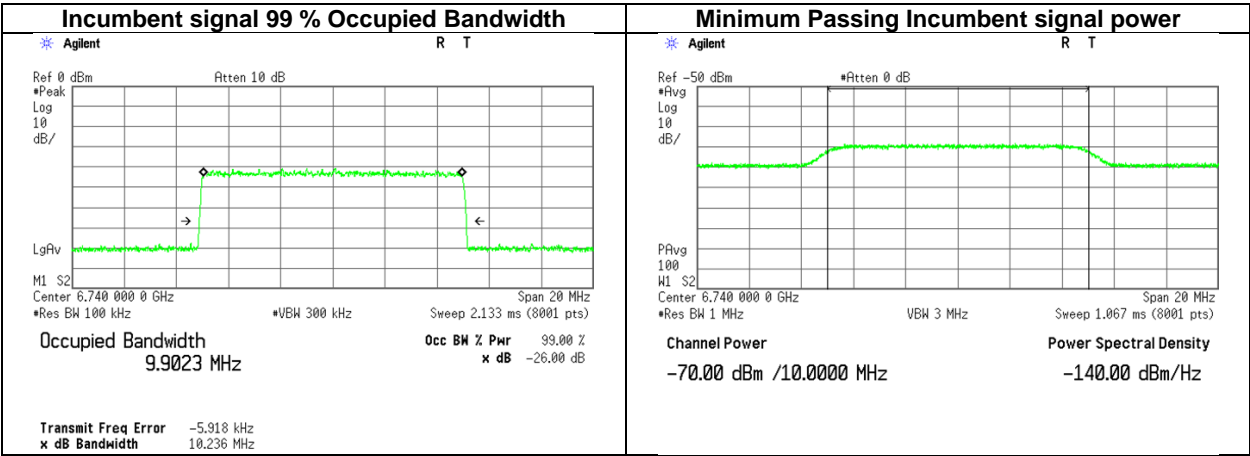
**Reference Plot
 U-NII-6**



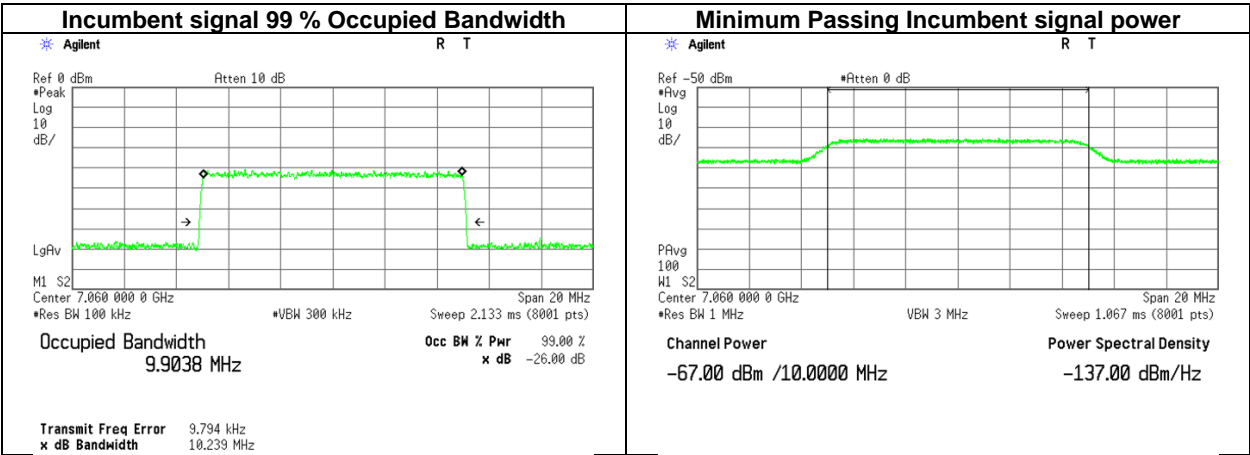
*Incumbent signal power takes into account customer-supplied cable losses.

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**Reference Plot
 U-NII-7**



**Reference Plot
 U-NII-8**



*Incumbent signal power takes into account customer-supplied cable losses.

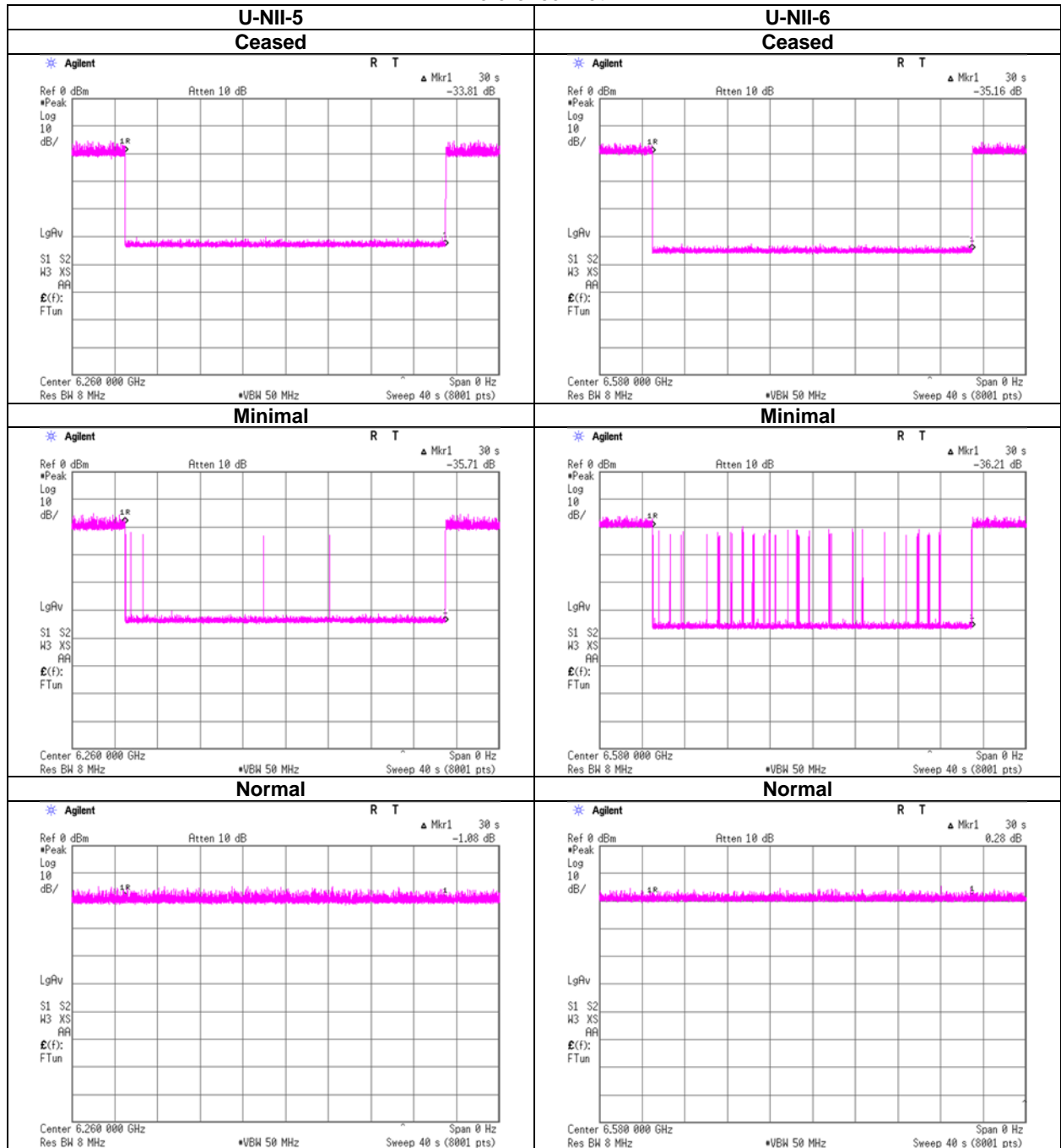
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EUT response to the applied incumbent signal

A link between the EUT and the Companion Device was established on the test channel. Traffic flowing from the EUT to the Companion Device was then initiated. A sweep was started, and the incumbent signal was continuously applied at approximately 5 seconds after the start of the sweep for a duration of 30 seconds and removed after the end of the observation period. Marker 1R is placed at the beginning of the observation period and Marker 1 is placed at the end of the observation period.

Transmissions cease while the Incumbent AWGN Signal is present and resume after it is removed. Span was set to zero to ensure detection of transmissions from the EUT.

Reference Plot



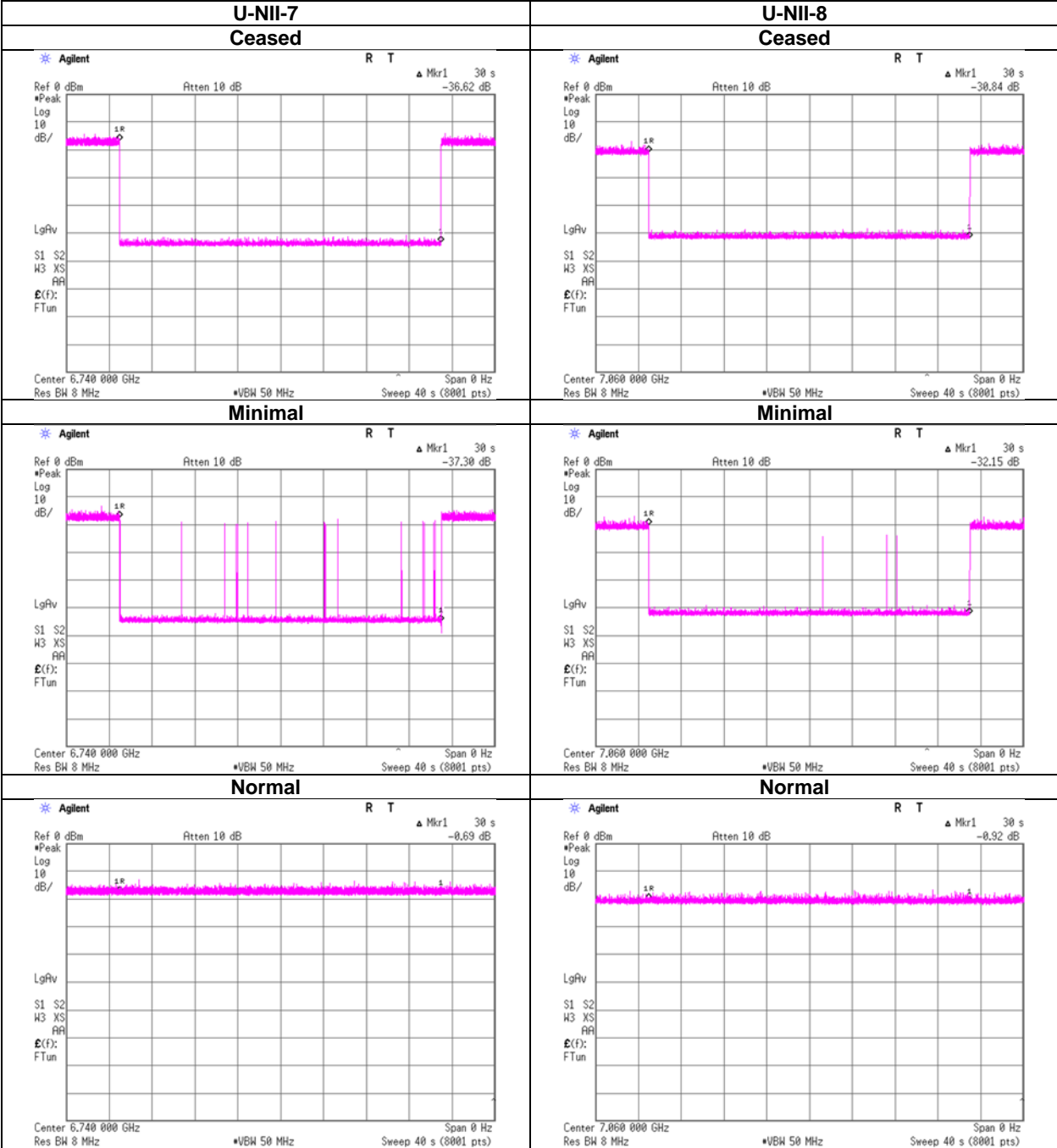
Ceased: The level at which no transmission is detected, consistently for a minimum period of 10 seconds.

Minimal: The AWGN level at which the system begins to trigger the transmission switch off, albeit not being kept off consistently.

Normal: The level at which there is no apparent detection and the operation of the EUT is still considered optimal.

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Reference Plot

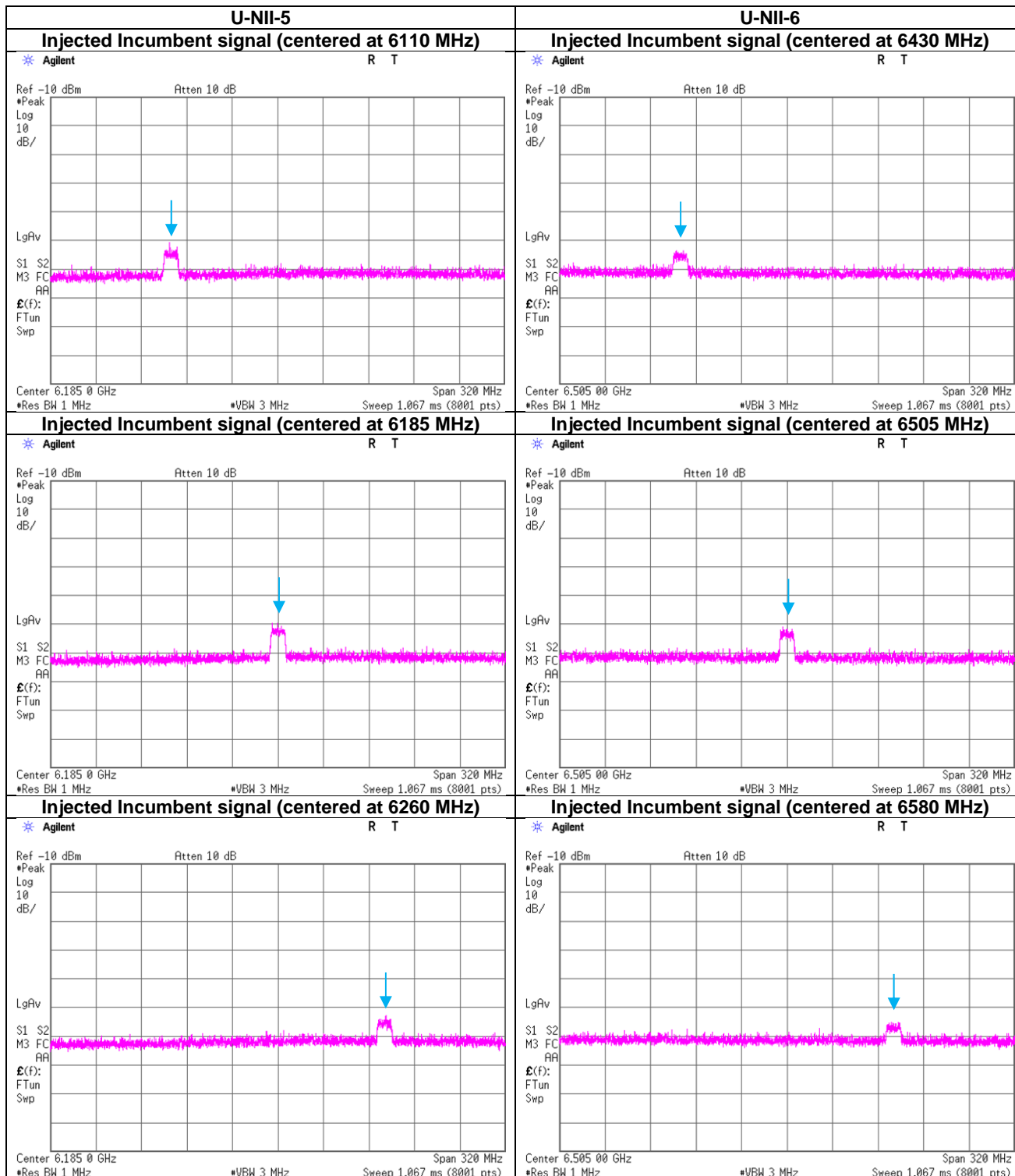


Ceased: The level at which no transmission is detected, consistently for a minimum period of 10 seconds.
 Minimal: The AWGN level at which the system begins to trigger the transmission switch off, albeit not being kept off consistently.
 Normal: The level at which there is no apparent detection and the operation of the EUT is still considered optimal.

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CBP Bandwidth Reduction Description

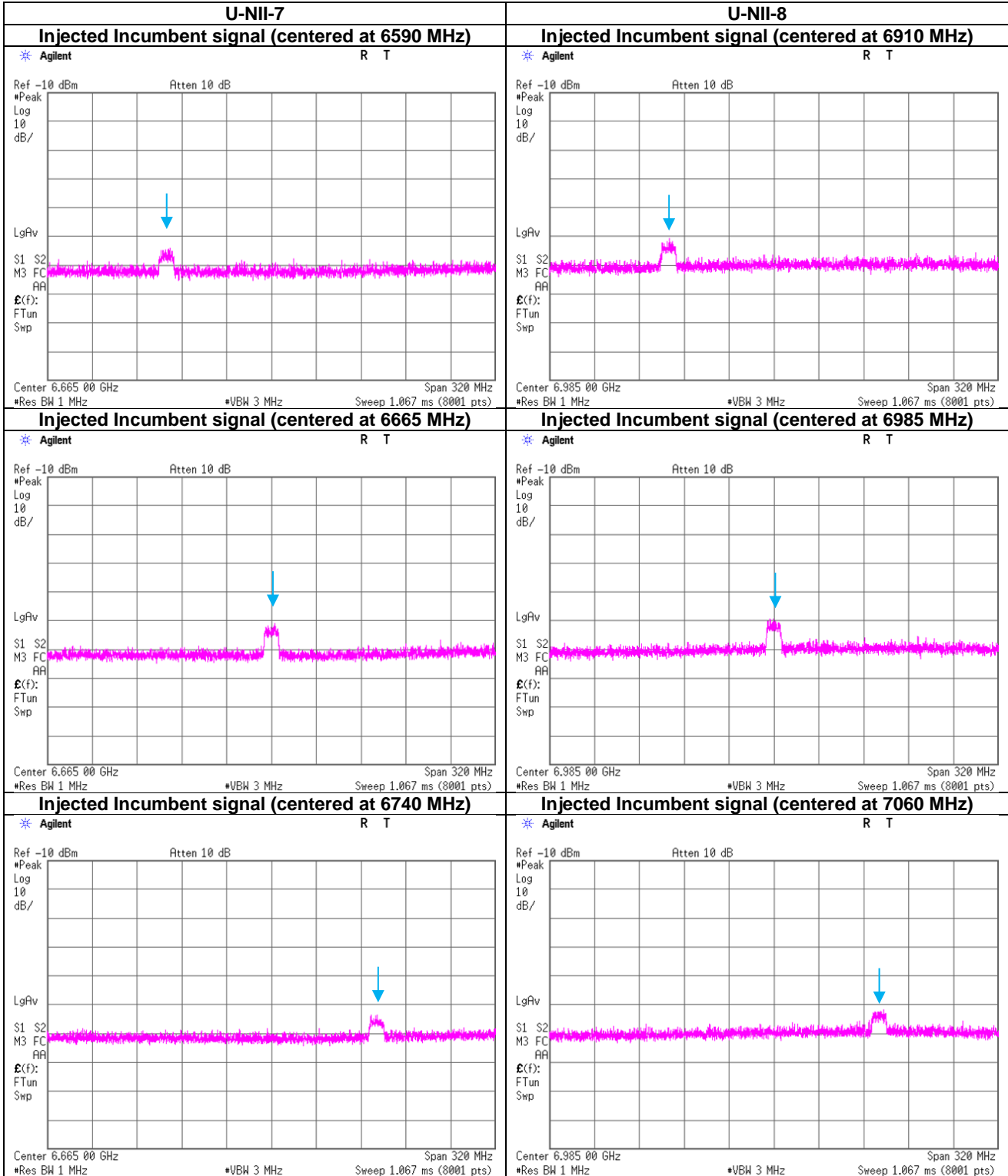
It was confirmed how the channel is reduced when AWGN is injected at the lower edge of the EUT channel, in the middle of EUT channel, and as closely as possible to the upper edge of the EUT channel.



*No EUT transmission was confirmed after the incumbent signal was injected.

→ : Incumbent Signal

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*No EUT transmission was confirmed after the incumbent signal was injected.

→ : Incumbent Signal

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Incumbent signal detection results

UNII Band	Center Frequency [MHz]	BW [MHz]	Incumbent Frequency [MHz]	Incumbent Power [dBm]	Cable Loss [dB]	Antenna gain* [dBi]	Adjusted Incumbent Power [dBm]	Detection Limit [dBm]	EUT Tx Status
5	6175	20	6175	-66.00	1.00	0.00	-67.00	-62.00	Ceased
				-67.00	1.00	0.00	-68.00	-62.00	Minimal
				-82.00	1.00	0.00	-83.00	-62.00	Normal
	6185	160	6110	-68.00	1.00	0.00	-69.00	-62.00	Ceased
				-69.00	1.00	0.00	-70.00	-62.00	Minimal
				-82.00	1.00	0.00	-83.00	-62.00	Normal
			6185	-65.00	1.00	0.00	-66.00	-62.00	Ceased
				-66.00	1.00	0.00	-67.00	-62.00	Minimal
				-82.00	1.00	0.00	-83.00	-62.00	Normal
			6260	-69.00	1.00	0.00	-70.00	-62.00	Ceased
				-70.00	1.00	0.00	-71.00	-62.00	Minimal
				-82.00	1.00	0.00	-83.00	-62.00	Normal
6	6475	20	6475	-66.00	1.00	0.00	-67.00	-62.00	Ceased
				-67.00	1.00	0.00	-68.00	-62.00	Minimal
				-82.00	1.00	0.00	-83.00	-62.00	Normal
	6505	160	6430	-69.00	1.00	0.00	-70.00	-62.00	Ceased
				-70.00	1.00	0.00	-71.00	-62.00	Minimal
				-82.00	1.00	0.00	-83.00	-62.00	Normal
			6505	-66.00	1.00	0.00	-67.00	-62.00	Ceased
				-67.00	1.00	0.00	-68.00	-62.00	Minimal
				-82.00	1.00	0.00	-83.00	-62.00	Normal
			6580	-71.00	1.00	0.00	-72.00	-62.00	Ceased
				-72.00	1.00	0.00	-73.00	-62.00	Minimal
				-82.00	1.00	0.00	-83.00	-62.00	Normal

Adjusted Incumbent Power = Incumbent Power - Cable Loss - Antenna gain

*The antenna gain value was applied as conservative condition.

The testing was performed with the AWGN signal set to Normal level (more than 20 dB below the -62 dBm threshold) and increased until the EUT detected and stopped transmitting (Ceased level).

EUT Tx Status means below

Ceased: The level at which no transmission is detected, consistently for a minimum period of 10 seconds.

Minimal: The AWGN level at which the system begins to trigger the transmission switch off, albeit not being kept off consistently.

Normal: The level at which there is no apparent detection and the operation of the EUT is still considered optimal.

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Incumbent signal detection results

UNII Band	Center Frequency [MHz]	BW [MHz]	Incumbent Frequency [MHz]	Incumbent Power [dBm]	Cable Loss [dB]	Antenna gain* [dBi]	Adjusted Incumbent Power [dBm]	Detection Limit [dBm]	EUT Tx Status
7	6695	20	6695	-68.00	1.00	0.00	-69.00	-62.00	Ceased
				-69.00	1.00	0.00	-70.00	-62.00	Minimal
				-82.00	1.00	0.00	-83.00	-62.00	Normal
	6665	160	6590	-70.00	1.00	0.00	-71.00	-62.00	Ceased
				-71.00	1.00	0.00	-72.00	-62.00	Minimal
				-82.00	1.00	0.00	-83.00	-62.00	Normal
			6665	-67.00	1.00	0.00	-68.00	-62.00	Ceased
				-68.00	1.00	0.00	-69.00	-62.00	Minimal
				-82.00	1.00	0.00	-83.00	-62.00	Normal
			6740	-70.00	1.00	0.00	-71.00	-62.00	Ceased
				-71.00	1.00	0.00	-72.00	-62.00	Minimal
				-82.00	1.00	0.00	-83.00	-62.00	Normal
8	6995	20	6995	-64.00	1.00	0.00	-65.00	-62.00	Ceased
				-65.00	1.00	0.00	-66.00	-62.00	Minimal
				-82.00	1.00	0.00	-83.00	-62.00	Normal
	6985	160	6910	-67.00	1.00	0.00	-68.00	-62.00	Ceased
				-68.00	1.00	0.00	-69.00	-62.00	Minimal
				-82.00	1.00	0.00	-83.00	-62.00	Normal
			6985	-64.00	1.00	0.00	-65.00	-62.00	Ceased
				-65.00	1.00	0.00	-66.00	-62.00	Minimal
				-82.00	1.00	0.00	-83.00	-62.00	Normal
			7060	-67.00	1.00	0.00	-68.00	-62.00	Ceased
				-68.00	1.00	0.00	-69.00	-62.00	Minimal
				-82.00	1.00	0.00	-83.00	-62.00	Normal

Adjusted Incumbent Power = Incumbent Power - Cable Loss - Antenna gain

*The antenna gain value was applied as conservative condition.

The testing was performed with the AWGN signal set to Normal level (more than 20 dB below the -62 dBm threshold) and increased until the EUT detected and stopped transmitting (Ceased level).

EUT Tx Status means below

Ceased: The level at which no transmission is detected, consistently for a minimum period of 10 seconds.

Minimal: The AWGN level at which the system begins to trigger the transmission switch off, albeit not being kept off consistently.

Normal: The level at which there is no apparent detection and the operation of the EUT is still considered optimal.

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Incumbent signal detection certainty results

UNII Band	Center Frequency [MHz]	BW [MHz]	Incumbent* Frequency [MHz]	Trial No.										Detection Rate [%]	Detection Rate Limit [%]	
				1	2	3	4	5	6	7	8	9	10			
5	6175	20	6175	○	○	○	○	○	○	○	○	○	○	○	100	90
	6185	160	6110	○	○	○	○	○	○	○	○	○	○	100	90	
			6185	○	○	○	○	○	○	○	○	○	○	100	90	
			6260	○	○	○	○	○	○	○	○	○	○	100	90	
6	6475	20	6475	○	○	○	○	○	○	○	○	○	○	100	90	
	6505	160	6430	○	○	○	○	○	○	○	○	○	100	90		
			6505	○	○	○	○	○	○	○	○	○	100	90		
			6580	○	○	○	○	○	○	○	○	○	100	90		
7	6695	20	6695	○	○	○	○	○	○	○	○	○	○	100	90	
	6665	160	6590	○	○	○	○	○	○	○	○	○	100	90		
			6665	○	○	○	○	○	○	○	○	○	100	90		
			6740	○	○	○	○	○	○	○	○	○	100	90		
8	6995	20	6995	○	○	○	○	○	○	○	○	○	○	100	90	
	6985	160	6910	○	○	○	○	○	○	○	○	○	100	90		
			6985	○	○	○	○	○	○	○	○	○	100	90		
			7060	○	○	○	○	○	○	○	○	○	100	90		

"○" means EUT ceased.

Blank means EUT did not ceased.

* Test was performed at the level which the EUT Tx Status was Ceased.

APPENDIX 2: Test Instruments

Test Equipment (1/2)

Test Item	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
AT	141156	Attenuator(10dB)	Weinschel Corp	2	BL1173	11/17/2023	12
AT	141312	Attenuator	Weinschel Associates	WA56-10	56100304	05/18/2023	12
AT	141395	Coaxial Cable	UL Japan	-	-	11/21/2023	12
AT	141420	Attenuator	Weinschel Associates	WA56-10	56100307	05/18/2023	12
AT	141557	DIGIITAL HITESTER	HIOKI E.E. CORPORATION	3805	070900530	01/31/2024	12
AT	141572	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	3401	01/10/2024	12
AT	141885	Spectrum Analyzer	Keysight Technologies Inc	E4448A	US44300523	11/29/2023	12
AT	227032	Power Meter	Raditeq (Formerly DARE!! Instruments)	RPR3008W	RPR8W-2201002	02/01/2024	12
AT	227033	Power Meter	Raditeq (Formerly DARE!! Instruments)	RPR3008W	RPR8W-2201001	02/01/2024	12
AT	230439	Automated EMC/RF Freeware	Raditeq (Formerly DARE!! Instruments)	RadiMation Free	2022.2.3	-	-
AT	244711	Thermo-Hygrometer	HIOKI E.E. CORPORATION	LR5001	231202105	01/25/2024	12
AT	141901	Spectrum Analyzer	Keysight Technologies Inc	E4440A	MY48250080	01/26/2024	12
CBP	141269	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	03/08/2023	12
CBP	141496	Function Generator	Keysight Technologies Inc	33250A	MY40012865	06/05/2023	12
CBP	141592	Power Divider DC-12.4GHz	Suhner	4901.19.A	-	05/26/2023	12
CBP	141885	Spectrum Analyzer	Keysight Technologies Inc	E4448A	US44300523	11/29/2023	12
CBP	142373	Microwave Cable	Junkosha	MMX221-00500DMSDMS	1502S311	-	-
CBP	142377	Microwave Cable	Junkosha	MWX-221-02000DMSDMS	1507S109	-	-
CBP	142378	Microwave Cable	Junkosha	MWX-221-02000DMSDMS	1507S110	-	-
CBP	142379	Microwave Cable	Junkosha	MWX-221-02000DMSDMS	1507S111	-	-
CBP	142735	Power Splitters/Combiners	Pasternack Enterprises	ZFRSC-123-S+	ZFRSC-123-00231	-	-
CBP	142736	Power Splitters/Combiners	Pasternack Enterprises	ZFRSC-123-S+	ZFRSC-123-00232	-	-
CBP	176125	Wireless Connectivity Test Set	Anritsu Corporation	MT8862A	6261711752	-	-
CBP	213581	Signal Generator	Rohde & Schwarz	SMW200A	107688	02/17/2024	12
CBP	244711	Thermo-Hygrometer	HIOKI E.E. CORPORATION	LR5001	231202105	01/25/2024	12
CE	141222	Coaxial Cable	Fujikura,HP,Mini-Circuits,Fujikura	3D-2W(12m)/ 5D-2W(5m)/ 5D-2W(0.8m)/ 5D-2W(1m)	-	02/17/2024	12
CE	141290	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	12/07/2023	12
CE	141357	LISN(AMN)	Schwarzbeck Mess-Elektronik OHG	NSLK8127	8127-729	07/05/2023	12
CE	141542	Digital Tester	Fluke Corporation	FLUKE 26-3	78030611	08/01/2023	12
CE	141951	EMI Test Receiver	Rohde & Schwarz	ESR26	101408	04/10/2023	12
CE	142004	AC2_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	12/12/2023	24
CE	142228	Measure, Tape, Steel	KOMELON	KMC-36	-	-	-
CE	178648	EMI measurement program	TSJ (Techno Science Japan)	TEPTO-DV	-	-	-

Test Equipment (2/2)

Test Item	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
CE	244707	Thermo-Hygrometer	HIOKI E.E. CORPORATION	LR5001	231202102	01/25/2024	12
RE	141265	Logperiodic Antenna (200-1000MHz)	Schwarzbeck Mess-Elektronik OHG	VUSLP9111B	9111B-190	07/11/2023	12
RE	141317	Coaxial Cable	UL Japan	-	-	09/12/2023	12
RE	141427	Biconical Antenna	Schwarzbeck Mess-Elektronik OHG	VHA9103B+ BBA9106	08031	07/11/2023	12
RE	141503	Horn Antenna 18-26.5GHz	EMCO	3160-09	1265	06/23/2023	12
RE	141512	Horn Antenna 1-18GHz	Schwarzbeck Mess-Elektronik OHG	BBHA9120D	254	10/17/2023	12
RE	141517	Horn Antenna 26.5-40GHz	ETS-Lindgren	3160-10	152399	11/20/2023	12
RE	141542	Digital Tester	Fluke Corporation	FLUKE 26-3	78030611	08/01/2023	12
RE	141579	Pre Amplifier	Keysight Technologies Inc	8449B	3008A02142	02/17/2024	12
RE	141588	Pre Amplifier	L3 Narda-MITEQ	AMF-6F-2600400-33-8P / AMF-4F-2600400-33-8P	1871355 /1871328	01/22/2024	12
RE	141594	Pre Amplifier	Keysight Technologies Inc	8447D	2944A10150	02/17/2024	12
RE	141901	Spectrum Analyzer	Keysight Technologies Inc	E4440A	MY48250080	01/26/2024	12
RE	141949	Test Receiver	Rohde & Schwarz	ESCI	100767	05/17/2023	12
RE	141978	Spectrum Analyzer	Keysight Technologies Inc	E4448A	MY46180899	03/06/2023	12
RE	142004	AC2_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	12/12/2023	24
RE	142006	AC2_Semi Anechoic Chamber(SVSWR)	TDK	Semi Anechoic Chamber 3m	DA-06902	10/20/2023	12
RE	142228	Measure, Tape, Steel	KOMELON	KMC-36	-	-	-
RE	160324	Coaxial Cable	Huber+Suhner	SUCOFLEX 102A	MY009/2A	10/05/2023	12
RE	178648	EMI measurement program	TSJ (Techno Science Japan)	TEPTO-DV	-	-	-
RE	212970	Signal Analyzer	Keysight Technologies Inc	N9030B	MY61330357	12/26/2023	12
RE	220646	Attenuator	Huber+Suhner	6806 N-50-1	-	03/17/2023	12
RE	225532	High Pass Filter 8-24.5GHz	TSJ (Techno Science Japan)	SCHPF-8000/ T4125-O/O	1504C	11/20/2023	12
RE	238712	Double Ridge Horn Antenna	Schwarzbeck Mess-Elektronik OHG	BBHA 9120 C	687	08/10/2023	12
RE	238713	Double Ridge Horn Antenna	Schwarzbeck Mess-Elektronik OHG	BBHA 9120 C	688	08/10/2023	12
RE	240023	Microwave Cable	Huber+Suhner	SF126E/11PC35/ 11PC35/1000MM, 5000MM	537060/126E / 537075/126E	09/08/2023	12
RE	244707	Thermo-Hygrometer	HIOKI E.E. CORPORATION	LR5001	231202102	01/25/2024	12

*Hyphens for Last Calibration Date and Cal Int (month) are instruments that Calibration is not required (e.g. software), or instruments checked in advance before use.

The expiration date of the calibration is the end of the expired month.

As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.

All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or international standards.

Test item:

AT: Antenna Terminal Conducted test

CBP: Contention Based Protocol

CE: Conducted Emission

RE: Radiated Emission