

IMPROVED INSULATING GLAZING UNIT THAT ALLOWS MOBILE SIGNAL TO ENTER INSIDE BUILDINGS



PRODUCT OVERVIEW

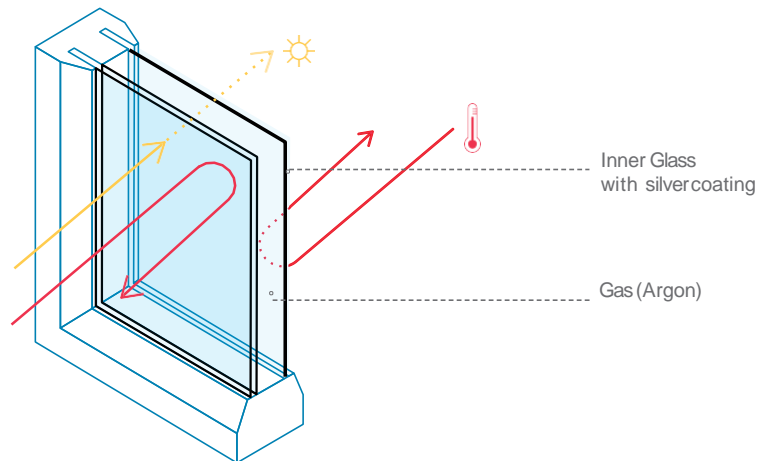
IMPACT OF GLAZING ON INDOOR MOBILE COVERAGE

Façade/roof material used today in energy efficient buildings prevent the signal from entering buildings.

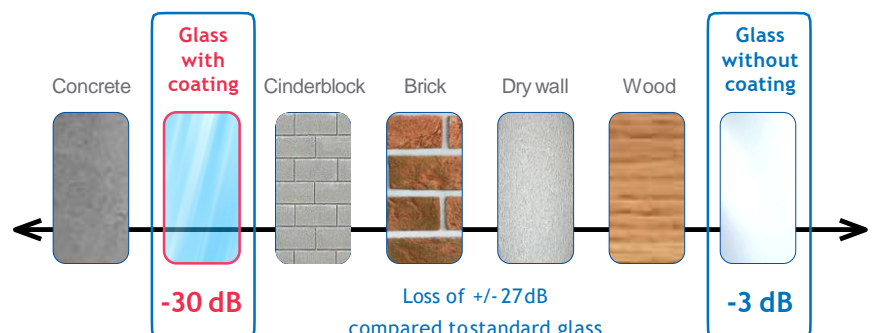
Glazing also plays a role in blocking radiowaves from penetrating indoor, as it is composed of a metal-based coating for thermal insulation.

A double glazing unit with thermal coating attenuates the signal by 30 dB, which means that 0.1% of the signal penetrates inside the building (compared to an attenuation of 3 dB for a glazing without coating, which corresponds to 50% of the signal entering the building).

A typical double glazing is composed of a metal-based coating for thermal insulation



Double glazing with thermal coating blocks radio waves, degrading cellular signal indoors



WAVETHRU, THE AGC SOLUTION FOR MOBILE INDOOR COVERAGE

AGC has developed WaveThru, which uses a unique laser pattern to apply a specific treatment on the low-emissivity metal based coating of the glazing.

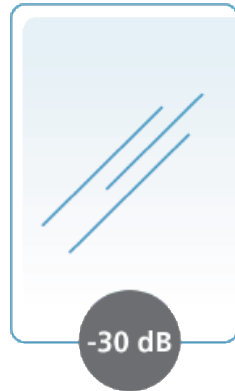
The laser engraved lines are of 30 µm, nearly invisible to the naked eye. As the treatment is so gentle, it does not affect the physical properties of the glazing, which remain the same.

A glazing on which WaveThru has been applied reduces the signal attenuation by 25 dB.

WaveThru can be adapted to each building, in terms of % of windows on which to apply the treatment and % of the glazing surface to treat for each window.

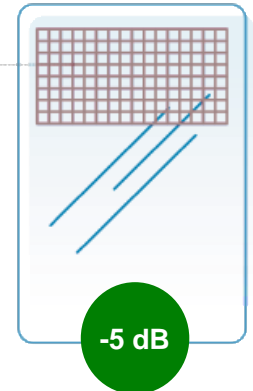
Improvement of double glazing with WaveTHRU

Double glazing with coating



Double glazing with coating + WaveTHRU

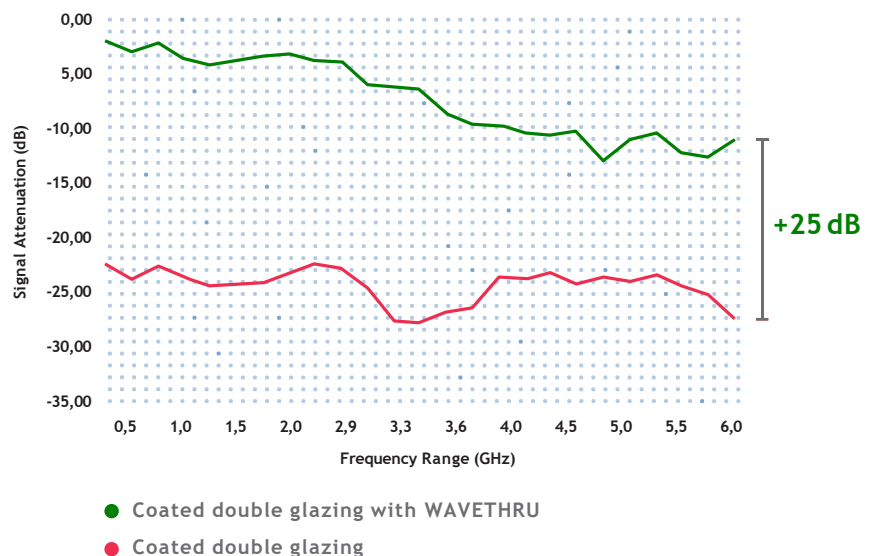
Laser engraved
+25 dB



Double Glass	Radio Signal Loss	Light Transmission	Solar Factor	U-Value
With coating	-30 dB	72%	38%	1.1
+ WAVETHRU	-5 dB	72%	38%	1.1

WAVETHRU PERFORMANCE ON DIFFERENT FREQUENCY BANDS

WaveTHRU performance on different frequency bands



WAVETHRU IS MULTI-FREQUENCIES

WaveThru allows to improve the indoor signal on all frequency ranges under 6GHz, which makes it a future-proof solution for 5G.

WaveThru is compatible with all angles of polarization.

In addition to that, AGC developed a specific pattern to make sure WaveThru can respond to the requirements of mmWave. More information available on request.

WAVETHRU BENEFITS

WAVETHRU BENEFITS IN A NUTSHELL

WaveThru presents many advantages compared to alternative solutions, notably the fact that it is compatible with all frequency ranges. This means there is no need to adapt the solution once a new technology is introduced, or if there is a change in an operator infrastructure.



BETTER QOS

- Improved quality of service indoor
- Multi-frequencies
- 5G future proof
- Less network load



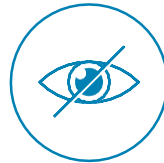
PASSIVE SOLUTION

- No need for heavy installations (DAS systems)
- No need for maintenance



EASY TO INSTALL

- Applicable on all windows
- Installation like any glass in a window frame



PRESERVED AESTHETICS

- Invisible to building occupants



PRESERVED EFFICIENCY

- Does not affect the glass insulation / thermal performances



BETTER FOR END-USERS

- Better radio signal means lower power emitting handset and longer battery life

TECHNICAL COMPATIBILITY

WAVETHRU CAN BE APPLIED ON ALMOST ALL GLAZING COMPOSITIONS

WaveThru is compatible with a large range of glazing compositions. Several coatings on a same glazing can be treated.

WaveThru is available for new construction, renovation, or retrofit (the treatment can be operated on site directly on an installed glazing).

Technical compatibility	Maximum size	1,5 x 4,0m
	Minimum size	0,2 x 0,3m
	Glazing Shapes	All shapes available
Glass processing	Type of glazing	DGU or TGU
	Number of coatings	1, 2 or 3 coatings
	Type of coatings	All coatings from AGC that contain silver
	Lamination	Laminated glass (on one or two glazing)

HOW AGC MAKES YOU BENEFIT FROM WAVETHRU IN 4 STEPS

WAVETHRU SERVICE

The objective with WaveThru is to guarantee a defined quality of signal in the building, with different thresholds that will be set based on occupants requirements.

Exemple of targets that could be defined:

- -95dBm @1,5m of the windows for 2G/3G (voice) and 4G (data) – good signal
- -105dBm in the center of the building for 2G/3G (voice) and 4G (data) – fair signal

Measures and simulations before the installation will allow to validate that targets can be met, and in what proportion WaveThru should be applied to achieve these targets.

Measures after the installation will serve as a guarantee that the targeted signal strength have been achieved.

A blue circle with the number 1 inside, connected to the next step by a vertical dashed line.

ON-SITE MEASURES + CUSTOMER NEEDS

- Outside signal measures
- Inside signal measures (when the façade is installed)
- Evaluation of customer needs

A blue circle with the number 2 inside, connected to the next step by a vertical dashed line.

SIMULATIONS AND RECOMMANDATIONS

- Simulation about the indoor coverage
- Different scenarios: fully coated glass, part of windows with WaveThru, full windows with WaveThru

A blue circle with the number 3 inside, connected to the next step by a vertical dashed line.

PROJECT EXECUTION

- Installation of the glazing (new construction or renovation)
- New measures on-site
- Delivery of a certificate for mobile indoor coverage

A blue circle with the number 4 inside, connected to the next step by a vertical dashed line.

PROPOSITION AND BUDGET OFFER

- AGC recommendation about where to install WaveThru and in which proportion
- Presentation of the budget for the windows installation

ANY QUESTION?

Contact us: wavebyagc@eu.agc.com